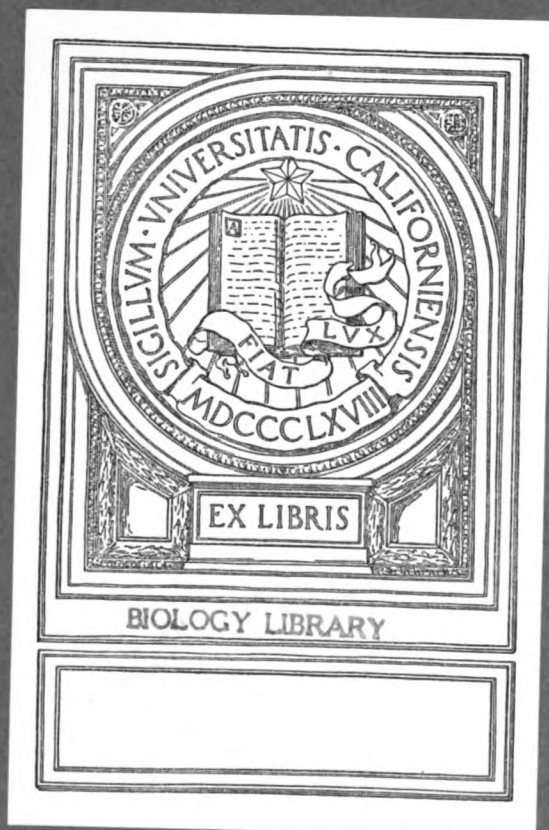

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Journal
of the
Royal Army Medical Corps

UNIV. OF
CALIFORNIA

Journal

OF THE

Royal Army Medical Corps

EDITED BY

COLONEL S. LYLE CUMMINS, *C.B.*, *C.M.G.*

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Journal of the Royal Army Medical Corps.

Original Communications.

ASPIRATION, AIR REPLACEMENT AND RADIOLOGY IN THE DIAGNOSIS AND PROGNOSIS OF HEPATIC ABSCESS.

BY COLONEL J. D. S. CAMERON, M.D., F.R.C.P. EDIN.,

Consultant Physician, Southern Army, India,

AND

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Specialist in Radiology, ——— British General Hospital.

ASPIRATION forms an integral part of the treatment of amœbic abscess of the liver, in combination with the administration of emetine. Surgical drainage should be restricted to those cases where mixed infection has occurred; the mortality from surgical drainage is much higher than in those cases treated with aspiration. While serving as treatment, aspiration can also be usefully employed in combination with air replacement as a diagnostic and prognostic procedure. This method gives an opportunity to estimate the size of the abscess and the amount of residual pus and to follow the changes occurring in the sac during the succeeding month to that in which the emetine course has been given.

Site of Aspiration.—The site of aspiration should be carefully selected. The great majority of amœbic abscesses are located superficially in the upper part of the right lobe near the superolateral surface of the liver. Consequently a site of election (8th to 10th interspace in mid-axillary line) can be advocated but it is important to note that, while giving pus from the majority of abscesses, it will not be the correct point to puncture in all instances. Accordingly very careful inspection and palpation should precede all aspirations. Local bulging will of course prove helpful, if present, but it will be visible only when an abscess is large and aspiration has been too long delayed. Palpation along the interspace and

2 *Aspiration, Air Replacement and Radiology in Hepatic Abscess*

ribs forms the best guide. A localized situation of tenderness is looked for and the discovery of such a point should lead to its choice for puncture in preference to the site of election. Frequently the two will coincide but even an inch of difference should dictate the choice of point of puncture. In two of the cases which were treated in this way a posterior approach was carried out with successful results. In one, previous puncture at site of election had failed; in both, the subsequent X-rays showed the posterior position of the abscess.

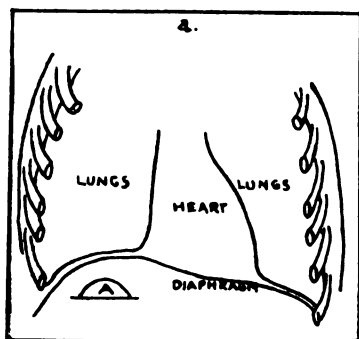
Technique.—For aspiration a two-way syringe with wide bore needle is preferred. The needle is best made to special length of $3\frac{1}{2}$ to 4 inches. Both of these lengths were employed successfully. Where longer needles have to be employed it is best that they be provided with a guard placed $3\frac{1}{2}$ inches from the point of the needle. Such a guard can be readily improvised from a collar screw obtained from pathological laboratory or engineers. The need for such precautions is brought out in the first of the diagrams reproduced from Sir James Cantlie's paper. The other diagrams from this paper demonstrate the method of puncture and site of election. A very useful needle for the purpose was that provided with Potain's aspirator. Using an adaptor this was employed in conjunction with the two-way syringe. Potain's aspirator itself did not prove a satisfactory instrument.

One hour prior to puncture morphine grain $\frac{1}{4}$ and hyoscine grain $\frac{1}{100}$, or some similar sedative, were given as premedication. Local anæsthesia proved sufficient thereafter in all cases. Superficial and track anæsthesia was established down to the surface of the liver. Following aspiration of as much pus as could be evacuated, air was forced in until pain was complained of by the patient either in the liver or in the right shoulder region. If no pain was previously complained of, it was considered sufficient to replace with air to half the volume of the pus removed. The preference for avoidance of general anæsthesia will be appreciated.

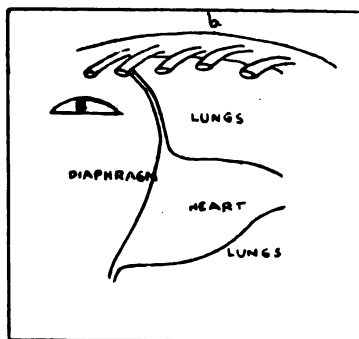
Radiology.—Prior to aspiration the patient, if fit, should be screened in the erect position. Suggestive findings are: (a) A high right diaphragm, immobile or moving poorly in comparison with the other side. (b) Local bulging of the right cupola—this local bulging when present gives information to the clinician of the best choice for the site and direction of insertion of the exploratory needle. Antero-posterior and lateral views are required for this purpose. (c) Rough or blurred outline of the right diaphragm as compared with the clear-cut outline of the opposite side. (d) Shadowing in the right costo-phrenic angle indicating effusion, often small in amount.

These signs are not diagnostic of hepatic abscess; some are indicative of the response of the diaphragmatic pleura to an inflammatory process below and close to the diaphragm. This inflammatory process may be hepatic or subphrenic. As these signs may not appear in hepatic abscess if the lesion is remote from the upper surface of the liver they are more constant in subphrenic abscess.

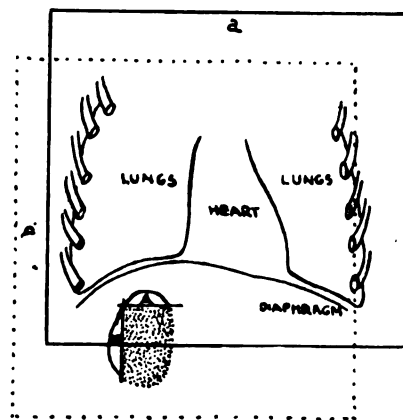
It is impossible on the radiological evidence alone to differentiate between hepatic and subphrenic abscess unless the latter contains gas. This will appear on screening and in the radiogram as a translucent area between the diaphragm and the upper surface of the liver. Gas in a subphrenic abscess is not infrequent



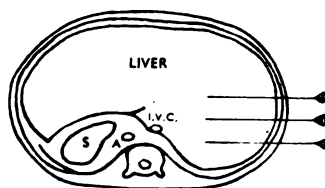
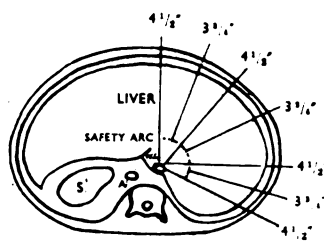
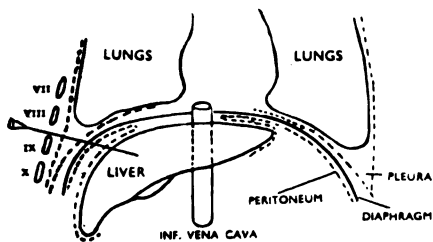
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especially if the abscess is a sequel to rupture of a hollow viscus, e.g. ruptured duodenal ulcer. The only other conditions in which gas may appear between the diaphragm and liver are: (a) After introduction of air into the peritoneal cavity for diagnostic purpose or during laparotomy. (b) Right-sided diaphragmatic hernia in which the gas-filled bowel may be between liver and diaphragm. (c) In cases of peritonitis caused or complicated by the presence of gas-forming bacilli.

The two last-named conditions are rare and, as the first will be obvious from the history, gas in this situation is practically diagnostic of subphrenic abscess.

The examination following aspiration and air replacement should be carried out on the day after tapping. Three radiograms should be taken of the area following screening:—

(1) in the antero-posterior position, erect.

(2) in the lateral position, erect.

(3) in the antero-posterior position with the patient lying on his left side. The cassette is placed vertically behind the patient and the central ray directed horizontally through the required area and at right angles to the plane of the film.

The factors used are as for chest radiography with some increase of kilovoltage but, if an upright Potter Bucky diaphragm is available, its use will give a much clearer picture.

The three radiograms are of value in determining the position, size and shape of the abscess cavity. The air outlines the upper part of the abscess and by superimposing the films a correct assessment of the complete size and outline can be obtained after due allowance has been made for distance of abscess from film. The estimate of the amount of residual pus is easily made. The illustrations demonstrate these points.

The examinations should be repeated a fortnight after the aspiration and thereafter at convenient intervals to determine shrinkage of the abscess cavity and absorption of residual pus. The air is not absorbed for upwards of a month. The need for further aspiration can thus be determined. If required, air replacement should again be carried out.

The use of radio-opaque substances such as lipiodol was considered. It was thought inadvisable to introduce such a slowly absorbed substance when air could be so readily employed.

The method has been applied to twelve cases of hepatic abscess with favourable results in all instances. In all twelve cases amœbæ were absent in the pus aspirated; in only three were they isolated from the fæces. The radiological demonstration of the abscess cavity, however, left no doubt as to the nature of the lesion. The radiology of the first case was carried out by Major A. B. Wayte, R.A.M.C., at — General Hospital, and for the radiograms used by us of this case we are indebted to him. The adoption of the full technique at a later date added to the information then received. The third position is essential if a complete idea of abscess size is to be obtained.

DE OPERCULIS.

FROM THE
FIELD SANITATION DEPARTMENT
OF THE
ARMY SCHOOL OF HYGIENE.

IN civil life conservancy of excreta and liquid wastes is normally effected by a water-borne system in which all fittings are "self-cleansing." In the field, where the water carriage of sewage is not possible, all such structures must be made so that they are "non-self-fouling"; or, if this is not immediately possible, so that they are readily available to frequent inspection and capable of being kept clean with the minimum of labour.

ALL LATRINES should :—

- be sited to avoid "nuisance" or pollution of water supplies, have firm standings with effective surface drainage around ;
- be provided at 5 per cent for the first hundred and 3 per cent thereafter, plus extra for officers, warrant officers and sergeants ;
- be screened and, if possible, roofed ;
- have adequate supplies of paper.

BUCKET AND DEEP EARTH LATRINES should :—

- be fitted with fly-proof seats ;
- have self-closing, fly-proof seat lids.*

DEEP EARTH LATRINES should :—

- be at least eight feet deep ;
- be protected against the emergence of flies by a heavily oiled layer all round below the soil surface ;
- be fitted with metal urine deflectors where necessary to prevent fouling of the superstructure.

Now, out of all that, let us confine our attention to one requirement—SELF-CLOSING, FLY-PROOF SEAT LIDS—remembering what is written above about fittings being "NON-SELF-FOULING," or not liable to become, and remain, fouled in or by normal use.

We are confronted with a round, or preferably oval, aperture which gives access to a noisome chamber. The problem is to provide (1) an adequate but easily removable covering which (2) will immediately replace itself when the purpose for which it was removed has been completed ; which (3) will not interfere with the achievement of that purpose ; and which (4) will resist the attentions—casual or deliberate—of the so-called "brutal and licentious" soldiery.

Easy . . .

Take some reasonably stout and seasoned planking ; cut out a square, or oblong, of adequate size, jointing the strips together with tongue and groove as necessary ; attach to the main structure by a pair of hinges ; fit, posteriorly, a prop or bar so that this lid cannot be raised quite to the true vertical . . . the job is done !

And how often, within twenty-four hours, is it not immediately undone?—because it does not meet the fourth of our requirements in the paragraph above.

Now, however brutal and/or licentious the soldier may be, he does not just pluck off latrine seat lids out of pure maliciousness or as evidence of simple “*joie de vivre*.” He does it for a reason. What?

That lid is uncomfortable.

How?

Try one in the early morning. Sit on a thoroughly damp seat and support a wet slab of wood on the back of the shirt you are wearing; and, while you’re doing so, think where that dampness has come from—not that that really matters; it’s only water, when all’s said and done. Still, the soldier doesn’t like it—nor would you. And who can say that it isn’t good soldiering—and even good citizenship—to obliterate what you don’t like because it is not good, what is apparently unnecessarily uncomfortable? Take Hitler and the Nazi creed—take slum housing—take . . .

However *we* have reasons, which have deeper origins in this matter, for insisting on that self-closing lid and so we’ve given a good deal of thought to the matter of meeting the soldier’s objection; for, mark you, the objection is a sound one and must be met. You’ve probably done so too; and, if that’s so, of course you’ve found a solution of the difficulty. Let’s see if yours is better than ours. Perhaps the best way of doing this will be to go through the several stages and arguments in a selected order—not necessarily that in which they occurred originally but one which may provoke even further and better ideas.

Now if a man is going to tear our lid off its hinges let us see what we can do towards defeating him at that game; not that we are going to make this our aim and end—rather the opposite; but it may be useful finally. Here is a simple hinge which will stand up to the assaults of the most infuriated soldier as long as any other part of the structure remains—indeed longer (fig. 1).

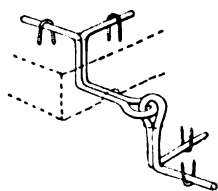


FIG. 1.

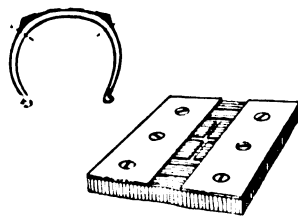


FIG. 2.

Now what does the soldier do? He liquidates the back-stop which prevents the lid passing the vertical and keeps it pressing on his back. In answer to that you agree also to do without it—provided you can lay hands on an old motor-car tyre. Pieces of this, cut on the cross and clamped on, outside up, in the firmest way you can, will close the lid automatically (fig. 2).

But we’re back where we started—or rather, our backs are—still wet. So out comes a jack-knife across the hinge and the soldier’s trouble’s over—our’s starts again. Still, the idea might come in useful later on.

Well—if we must have our backs wetted, let us have them wetted as little as possible. We can make the lid hollow, so to speak : cut out all that part which rests on the back except a minimum necessary to keep the real lid away—make something like the common tin lid and stretch wires across from edge to edge—a bad description, but a good picture (fig. 3) :—

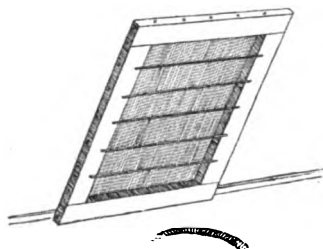


FIG. 3.

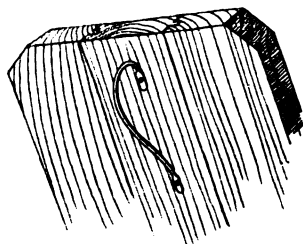


FIG. 4.

Then there comes a brain wave—perhaps the first yet ! Let's push the lid off the back altogether by means of one stout, curved wire (fig. 4). Then, surely, we've got to the absolute minimal point of contact—short of a spike, which would scarcely serve our ends (perhaps it would be better to say—meet our requirements!).

And still the lid's torn off.

Why ?

Well, try it yourself. The *seat's* wet where the lid covered it !

He had a legitimate grouse, that " B. & L." soldier, hadn't he ?

All right. That's a very simple carpentering job. We won't let the lid cover the seat, we'll make it sit into the hole (fig. 5).

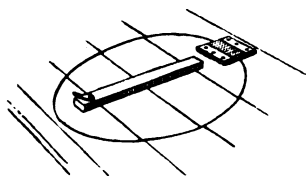


FIG. 5.

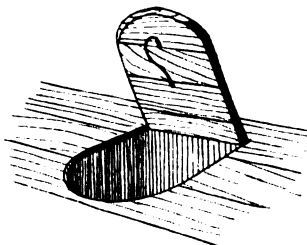


FIG. 6.

Then there'll be this advantage, too, that if we're careful (or shall we say skilful) about our carpentry we can make the seat and the lid both out of the same piece of wood—economy—grand !

Try it out—and you'll find it extraordinarily difficult to get your . . . well, to be able to sit comfortably and effectively on the apparatus.

And, because there's only room for one hinge, this lid will come off even more rapidly than the others. Also, sooner or later it will work a little loose, if it lives long enough, and won't fall back true into place so that gaps appear and flies get in.

Undiluted cursing ! What's wrong ? We know how to fasten the lid on. We

know how to keep all but the barest minimum of the back dry. We know how to keep the seat dry. But we can't—in short, we want more room.

Well, let's take it.

Must a latrine aperture be oval?

It always is, you say. But that's not good enough for us.

Cut it U-shaped: bevel the edges and let the lid in: tack on the little curved wire: make your hinges (here you can put two and make a stable job) from an old tyre . . . does that fill the bill? (fig. 6).

Try it out—and sit and think awhile.

At any rate we've found an escape from that other bug-bear—the fouling of the rear edge of the seat. Now this can't be done (we'd like to see the man who can) because, practically, there isn't a rear edge.

By the way, isn't much of that trouble due to the conventional height of the "superstructure"? If we cut that down three or four inches the "operator" wouldn't be inclined—or able—to adopt the "back-firing" position. Anyway, you know all about the inguinal rings, so why strain that point?

It was that objection of possible fouling, as well as the fact that its construction demanded skill such as might not be found elsewhere—sorry!—everywhere, no less than that it depends on breakable parts, that kept the sliding-lid type rather as a museum piece (fig. 7).

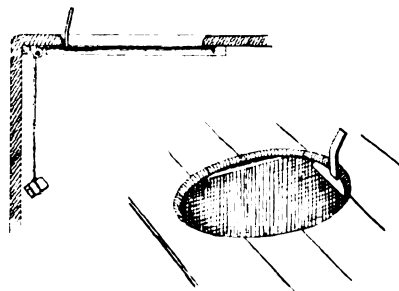


FIG. 7.

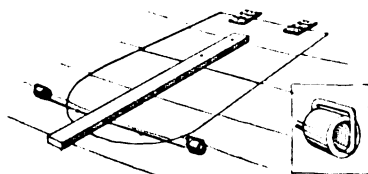


FIG. 8A.

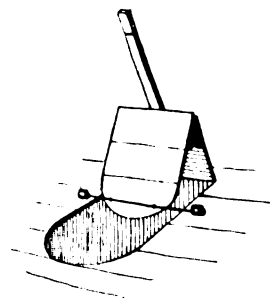


FIG. 8B.

Very ingenious—and it does work—until the string breaks; then, of course, it's not so easy to repair.

And then, finally,—you've had about enough of this—no?

Well—just think over this one (figs. 8A and 8B).

R. A. M.

FIXED DOSE *VERSUS* HORROCKS TEST IN THE CHLORINATION OF WATER SUPPLIES IN THE FIELD

By MAJOR R. ST. JOHN LYBURN, M.D., M.R.C.P.(I.),

AND

SERGEANT J. E. RIDLEY,

Royal Army Medical Corps.

INTRODUCTION.

THERE are four methods in general use for the chemical sterilization of water supplies in the field.

<i>Type of water</i>	<i>Method</i>	<i>Dose of chlorine parts per million</i>	<i>Contact period</i>	<i>Antichlor</i>
1. Filtered ..	Chlorination ..	1.0 in excess of chlorine deviated	30 mins.	None
2. Filtered ..	Super-chlorination	2.0 in excess of chlorine deviated.	15 mins.	Sodium thiosulphate
3. Filtered or unfiltered.	Fixed dose chlorination.	4.0	30 mins.	Sodium thiosulphate
4. Filtered ..	Chloramination ..	2.0	60 mins.	None

In methods 1 and 2, the Horrocks Test is used to estimate the "chlorine absorption figure" of the water so that sufficient water sterilizing powder can be added to maintain a concentration of either :—(1) one part per million of free chlorine over a period of thirty minutes or (2) two parts per million of free chlorine over a period of fifteen minutes as outlined in Army Training Manuals.

Method 3 is used whenever a Horrocks Box is not available and Method 4 for bulk supplies at Bases where Water Points are established with conditions similar to civilian supplies.

THE HORROCKS TEST.

Many sources of error can occur in this test due to manufacturer's inaccuracies, e.g. (a) 6 white cups selected at random from 72 cups and filled to within one-quarter of an inch of the brim. Volumes ranged from 167 to 198 ml. (b) 6 black cups selected at random from 24 cups and filled to white line on inside. Volumes ranged from 230 to 258 ml. (c) 10 scoops selected from tins of W.S.P. and a level scoopful of powder weighed. Variation from 2.2 to 2.7 grammes. (R.A.S.C. Spec. 2 grammes) [1]

In the teaching of the Horrocks Test, the selection of the correct Indicator Cup is of importance for accurate interpretation. A white cup of distilled water to which 1 part per million of chlorine and 3 drops of standard cadmium iodide and starch solution have been added will show an Oxford blue colour with the bottom of the cup only just visible. This should be the correct colour to select when performing the Horrocks Test if 1 part per million of chlorine is required as a residuum after thirty minutes contact with the water under test. It has been found, however, that a water containing 0.5 part per million of free chlorine will

10 *Fixed Dose versus Horrocks Test in the Chlorination of Water*

give different blue colours with increasing amounts of indicator solution. If 3 drops of indicator are added, a Cambridge blue colour will result, and by adding further drops the colour deepens to an Oxford blue and then to an inky blue black colour. This suggests that the indicator solution should contain more iodide, as there is not a complete replacement of chlorine by iodine when 3 drops are added, and instead of free iodine there may be iodine chloride formed which does not give a blue colour with starch.

In many cases the Water Duty man adds more than 3 drops of indicator to one or two of the cups with a result that cups 3 and 4 may be paler in colour than cups 1 and 2. It is a mistake, therefore, to attempt to estimate the free chlorine content of a water by depth of blue colour after addition of starch iodide solutions.

When teaching the Horrocks Test, it should be pointed out that the addition of drops of standard W.S.P. solution to white cups of the sample simply compares with the addition of scoopfuls of the particular powder to 100 gallons of the water. The introduction of "parts per million" tends to confuse the Water Duty man with no knowledge of chemistry.

By calculation, a water sterilizing powder containing 25 per cent available chlorine when used to perform the Horrocks Test should impart an additional 1 part per million of chlorine to each successive cup but, when titrated by standard laboratory methods, the addition is in the region of 0.7 to 0.8 part per million. No explanation of this discrepancy is offered, and similar results have been noted in the unpublished work of a civilian waterworks chemist who found that the estimated chlorine figure from bleach powders was higher than the actual figure obtained in distilled water.

The Horrocks Test is too often regarded as a chemical test for the purity of a source of water whereas a dangerous water with large numbers of pathogenic bacteria may deviate only a little chlorine and a relatively safe water with a fair amount of organic or inorganic matter will deviate considerably more. Thus the operator can interpret a "2 scoop water" as being *purer* than a "4 scoop water" as a source of supply.

In the field, notice boards are erected to indicate the number of scoopfuls of W.S.P. required to sterilize a source of water. Although this figure is obtained by daily tests, it is only true for the particular powder in use at the time and allowance must be made for weaker powders and possible changes in the chlorine absorption figure due to land washings, etc., after heavy rainfall.

Finally the Horrocks Test should be taught as a *practical* one, which ensures a residuum of chlorine at the end of the prescribed contact period, whereas the introduction of "parts per million" tends to make the test look an exact chemical estimation.

FIXED DOSE CHLORINATION.

Instructors are invariably questioned about the addition of a gross amount of chlorine capable of sterilizing water under the worst conditions to be expected followed by dechlorination with thiosulphate. Mackenzie [2] suggested that if the Horrocks Box were discarded and a Fixed Dose substituted, clarified water

would be dosed with 3 parts per million of chlorine and unclarified water 4 parts over a contact period of fifteen minutes.

The Halazone tablet in the Individual Outfit for use with water bottles is one example of Fixed Dose chlorination, 4 parts per million of chlorine being imparted to the water (if tablets up to strength) and dechlorination effected with a tablet of thiosulphate after thirty minutes contact with filtered or unfiltered water. Whilst this article was being written, such an outfit was reported in the *British Medical Journal* (July 18) for civilian use. An ampoule of sodium hypochlorite is provided to give an extravagant dose of chlorine to 2 gallons of water and dechlorination is effected after five minutes contact. No specific type of water, filtered or unfiltered, is mentioned in the instructions. The advantage of the civilian outfit is the stability of the chlorine compound, as Halazone tablets must be tested from time to time for deterioration.

In the field, a method of demonstrating the presence of chlorine at the end of the contact period is desirable to establish confidence in the sterilization before adding the antichlor. Starch iodide solutions can be used, but if orthotolidine is substituted and used with a Fixed Glass chloroscope, compensating for natural colour in the water, the operator can be certain that *at least* 2 parts per million of chlorine have been in contact with the water (*see fig. 1*).

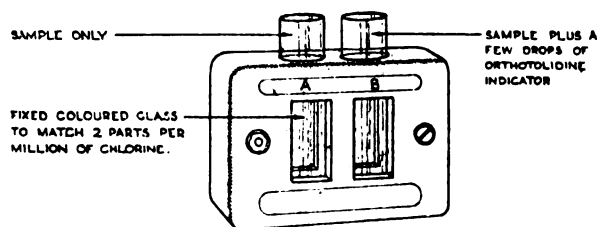


FIG. 1.

RELATIVE MERITS OF THE TWO METHODS.

The arguments for and against Fixed Dose and Horrocks Test methods are briefly summarized from Mackenzie [2].

Fixed Dose—For.

- [1] Simplification and elimination of the Horrocks Test.

Fixed Dose—Against.

- [2] No method of estimating strength of W.S.P.
- [3] May be uneconomical on most occasions.

Horrocks Test—For.

- [4] Automatic compensation for chlorine deficiency of weak powders and for rapid deviation of chlorine by reducing substances in natural waters.

- [5] Apparatus available for testing strength of W.S.P. with reasonable accuracy.

- [6] Treatment of small quantities of water possible, e.g. water bottles, etc.

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Horrocks Test—Against.

[7] Does not compensate for deficiency of chlorine in weak powders when superchlorinating. Hilton Sergeant [5] has added the following advantages to the Horrocks Box :—

Horrocks Test—For.

(8) Deviation of large amount of chlorine as shown by Horrocks Test suggests presence of mustard gas.

(9) The colour test, performed after treatment of water, demonstrates presence of free chlorine and, therefore, absence of mustard gas.

Regarding the above arguments the following observations are made.

Fixed Dose—For.

(1) It is agreed that simplification is desirable, particularly when large numbers of men are receiving training in the minimum possible time.

Fixed Dose—Against.

(2) If deterioration of W.S.P. can be eliminated, no estimation of strength would be necessary. This could possibly be effected by packing a Fixed Dose for 100 gallons of water in a sealed waxed envelope or ampoule.

(3) Relative costs will be discussed later.

Horrocks Test—For.

(4) This is the strong point of the test and is agreed to be an important factor but, under active service conditions, the quick turnover ensures a strong powder which rarely falls below 20 per cent before the tin is exhausted.

(5) To ascertain the practical value and possible error of this test, observations were made under field conditions. Trained and untrained observers were given a W.S.P. for test after laboratory titration.

Results :—

	No. of observers	Trained or untrained	Average of readings	Maximum reading	Minimum reading	Laboratory titration
Set A	19	All trained	19.1%	25%	13%	19.8%
B	17	All untrained	19.06%	26%	12%	19.8%
C	1	*Trained	27.4%	30%	24%	24.8%
D	1	*Trained	27.4%	31%	21%	24.8%

* In set C the observer used different boxes and in set D the same box for each of 10 observations.

It will be seen from Sets A and B that there is little difference in accuracy between skilled and unskilled observers and both sets show wide individual variations. In Sets C and D, the single trained observer is more consistently accurate than mixed observers but shows a definite bias towards high readings, whether using the same box or different boxes. No space is available for complete tabulation of individual results.

(6) The use of the Horrocks Box for treatment of small quantities of water can be eliminated if a scoop to contain 3 ml. of liquid is incorporated in a water bottle (see fig. 2).

Horrocks Test—Against.

(7) This defect has always been apparent and the teaching should stress a full strength powder wherever possible. With a weak powder, the extra scoopful

required for superchlorination may only impart an additional 0.5 part per million instead of 1 part.

Regarding the arguments put forward by Hilton Sergeant.

Horrocks Test—For.

(8) The use of the Horrocks Test as a presumptive mustard gas test is superfluous when a test for poisons has been carried out by the Medical Officer. When a Poisons Test Case is not available, it should be remembered that other war gases will also deviate comparatively large amounts of chlorine.

(9) This point is important but a Fixed Dose method incorporating a qualitative test for free chlorine would be as efficient.

After consideration of the above arguments the following method is suggested to eliminate the Horrocks Test and its consequent difficulties.

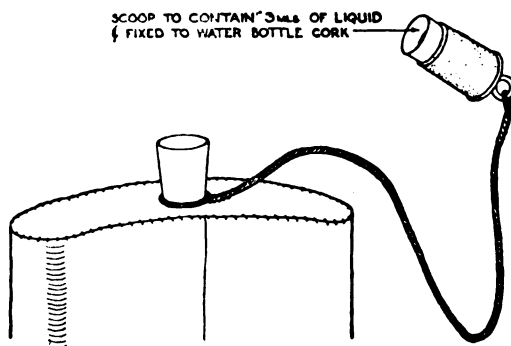


FIG. 2.

FIXED DOSE LIMITESTER METHOD.

Apparatus and reagents required :—

(1) Lovibond Fixed Glass chloroscope (similar to phosphatase Limitester used in milk analysis) to read 2 parts per million of chlorine with orthotolidine reagent.

(2) Sealed waxed envelopes or ampoules containing sufficient W.S.P. to impart 5 parts per million of chlorine to 100 gallons of water (about 12 grammes would be required).

(3) Sealed waxed envelopes or ampoules containing sufficient anhydrous sodium thiosulphate to remove 4 parts per million of free chlorine from 100 gallons of water (about 4 or 5 grammes would be required).

Method.—(1) Add contents of 1 envelope of W.S.P. to a small tin or vessel, make into a thin paste with a little water, dilute and add to 100 gallons of water and mix thoroughly.

(2) Allow fifteen minutes contact and draw off a sample into the Limitester tubes. Add a few drops of orthotolidine reagent to tube marked B and allow to stand for five minutes. If the colour which has developed in tube B is deeper than that in tube A, the water is sterilized and can be dechlorinated if required for use by adding the contents of 1 envelope of thiosulphate and stirring well. If the colour in tube B is lighter than that in A, add a further envelope of W.S.P.

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as above, allow ten minutes contact and re-test with Limitester before dechlorination.

(3) For small quantities of water use the "Water Bottle Method."

INVESTIGATION OF THE METHOD.

Mackenzie has demonstrated the efficiency of chlorine in providing a safe water with doses of 0.5 to 2.0 parts per million in excess of the amount deviated over short contact periods, using *Bact. coli* as a control. Thresh [3] expresses the opinion that sewage effluents conforming to Royal Commission standards can be effectively chlorinated with doses ranging from 1 to 5 parts per million, *Bact. coli* being destroyed so that the majority of samples are negative in 10 ml., but does not specify any contact period.

The suggested Fixed Dose Limitester method would ensure an immediate concentration of 5 parts per million of chlorine and by testing *quantitatively* at the end of the contact period would indicate that *at least* 2 parts per million had been in contact with the water. As a confirmation of the efficiency of chlorine in sterilizing grossly contaminated waters and to ascertain the value of the suggested method, several experiments were conducted.

Before starting the experiments, it was decided to use a lake water which had been clarified by filtration through metal filters using filter powder (Kieselguhr) as filter aid. Measured amounts of a crude sewage containing particulate matter were then added to this clarified water for testing the method. Saline suspensions of *Bact. coli* added to distilled or dechlorinated tap water are more easily killed by chlorine than *Bact. coli* introduced by crude sewage with particulate matter and ammonia to retard sterilization.

All chlorinated water samples were taken in bottles into which a crystal of sodium thiosulphate had been introduced before laboratory sterilization so that dechlorination was immediate. Bacteriological examinations were based on the Ministry of Health presumptive coliform test [4].

Experiment 1.—A 200 gallon water tank truck was filled with clarified lake water and crude sewage containing particulate matter added to obtain a concentration of 1 part of sewage to 5,000 parts of water. Water Sterilizing Powder was added to give an immediate concentration of 5 parts per million of chlorine.

	Bacteriological results.						Residual chlorine at 15 mins.
	50	10	1.0	0.1	0.01	0.001	
Sample A. (Clarified lake water plus sewage)	+	⁵ +/ ₅	⁴ +/ ₅	⁵ +/ ₅	⁴ +/ ₅	Neg.	—
Sample B. (Sample A after 15 mins. con- tact)*	Neg.	—	—	—	—	—	4.6 parts per mil- lion.

* Sample taken at 5 mins. was negative in 50 mls.

Experiment 2.—Before increasing the sewage content, the possibility of particulate matter retarding sterilization was considered and a decision made to perform two tests.

(1) Pollute the clarified lake water to obtain a concentration of 1 part of sewage to 1,000 parts of water and add 5 parts per million of chlorine.

(2) To *filter* this sewage polluted lake water through metal candles using Kieselguhr followed by 5 parts per million of chlorine.

				Bacteriological results mls. of sample			Residual chlorine at 15 mins.
				0.1	0.01	0.001	
Test 1.	50	10	1.0				
Sample A. (Clarified lake water plus sewage)	+	5+/5	5+/5	5+/5	4+/5	2+/5	—
Sample B. (Sample A after 15 mins. con- tact)	+	1+/5	Neg.	—	—	—	3.9 parts per mil- lion.
Test 2.							
Sample C. (Sample A after filtration)	+	5+/5	4+/5	—	2+/5	Neg.	—
Sample D. (Sample C after 15 mins. con- tact)*	Neg.	—	—	—	—	—	4.2 parts per mil- lion.

* Sample taken at 5 mins. was negative in 50 mls.

This experiment stresses two important points:—

(a) efficiency of metal filters when using filter powder Kieselguhr as filter aid in reducing numbers of bacteria and, more important, the removal of small particles containing "clumps" of bacteria.

(b) with unfiltered water, a dose of 5 parts per million of chlorine left a residuum of 3.9 parts after fifteen minutes contact and, although insufficient to kill all coliform organisms embedded in particulate matter, reduced the number to 3 per 100 ml. It is doubtful whether the Horrocks Test with its maximum residual chlorine figure of 2 parts per million would have reduced the number to this extent.

Experiment 3.—To demonstrate the importance of filtration more clearly, the concentration of sewage was increased to 1 in 10 and Experiment 2 repeated.

				Bacteriological results mls. of sample			Residual chlorine at 15 mins.
				0.1	0.01	0.001	
Test 1.	50	10	1.0				
Sample A. (Clarified lake water plus sewage)	+	5+/5	5+/5	5+/5	5+/5	5+/5	—
Sample B. (Sample A after 15 mins. con- tact)	+	1+/5	Neg.	—	—	—	1.2 parts per mil- lion.
Test 2.							
Sample C. (Sample A after filtration)	+	5+/5	5+/5	5+/5	4+/5	2+/5	—
Sample D. (Sample C after 15 mins. con- tact)*	Neg.	—	—	—	—	—	2.5 parts per mil- lion.

* Sample taken at 5 mins. was negative in 50 mls.

A striking example of the efficiency of filtration in removing "clumps," the chlorine being effective in five minutes with filtered water. With unfiltered water, 5 parts per million of chlorine reduced the number of coliform organisms to 3 per 100 ml. in fifteen minutes. No experiments were conducted to ascertain the amount of chlorine required to provide a coliform free water in the presence of particulate matter.

THE IMPORTANCE OF FILTRATION.

It will be seen from the above experiments that chlorination of filtered waters with a Fixed Dose of 5 parts per million is extremely effective but that all waters containing particulate matter will require larger doses or a longer contact period.

Filtration is too often regarded as only a *necessary*, rather than an *essential*, stage in the purification of water supplies and sterilization regarded as the "be all and end all" rather than a finishing barrier. In tropical and sub-tropical regions, efficient filtration of water is of the greatest importance in removing

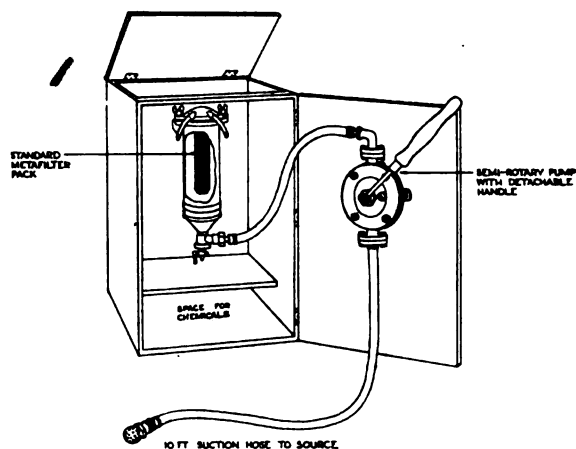


FIG. 3.

pathogenic protozoa such as the cysts of *Entamoeba histolytica* and *Giardia lamblia*. Disease producing helminths such as the larvæ of *Ancylostomes*, ova of *Tænia solium* (Somatic Tæniasis), the cyclops of *Dracontiasis*, the larvæ of *Strongyloides stercoralis*, and the great majority of pathogenic schistosomes are likewise removed by efficient filtration. If reliance were placed upon chlorine to kill cysts of *E. histolytica*, the quantity required would be in the region of 500 parts per million. By using thiosulphate, this amount of chlorine could be removed but the end products would render the water quite undrinkable.

For bulk supplies and unit purification, adequate filtration is provided by using Mobile Water Purifiers (3,000 gallons per hour) and Water Tank Trucks or Trailers fitted with high pressure metal filters using filter powder (Kieselguhr). To units such as companies, the Portable Filtering Apparatus is issued but, as this apparatus weighs from 137 to 180 pounds, depending upon the method of packing in panniers, it would be better named "Transportable."

For small parties of men on patrol, no filtering apparatus is available and reliance is placed upon the Halazone tablet for sterilization of water bottles. As there is no filtration barrier, it is not considered that 4 parts per million of chlorine is sufficient under these circumstances for grossly polluted waters containing particulate matter which may be the only available source and a larger dose of chlorine should be given.

The alternative is a truly *portable* filter to be carried easily by one man and able to fill the water bottles of 50 men in fifteen minutes followed by sterilization with the existing Halazone tablet.

Several designs have been suggested to reduce the weight of the existing Portable Filter, a successful one being a semi-rotary pump (with air bottle removed) fitted to a single pack domestic type Metafilter, the whole apparatus with chemicals being packed in a light pannier for transport (see fig. 3). The total

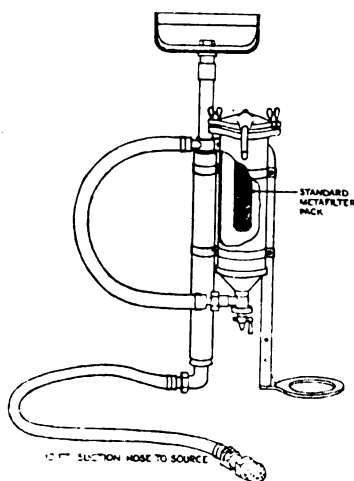


FIG. 4.

weight of this apparatus (excluding pannier) is about 20 pounds and it will effectively filter 12 to 15 gallons of a water containing 5 parts per 100,000 suspended solids in fifteen minutes, i.e. sufficient for 50 water bottles.

Although efficient and capable of being carried by one man, the apparatus was considered to be too heavy and a suggestion was made that the civilian type stirrup pump could be substituted for the semi-rotary pump with a consequent reduction in weight (see fig. 4). Total weight excluding canvas bag and chemicals—15 pounds. The apparatus was as efficient as the semi-rotary pump model and filled 50 water bottles in fifteen minutes without undue effort.

On both types, backflushing arrangements were purposely omitted to reduce weight, the method of cleaning being the removal of the filter head with filter attached and washing in the source. On return from patrol, the rings of the filter pack are loosened and brushed in clean water, this process being equivalent to

backflushing. The amount of chemicals required for both filters is as follows :—

1 day patrol of 50 men using 1 gallon per head per day.

Filter Powder Kieselguhr 4 to 6 charges of $\frac{1}{2}$ oz. each .. 2 or 3 oz.

Halazone outfits (50 tablets in each) 4 or 5

The weights of the components could be considerably reduced by cutting the diameter of the filter chamber to a minimum and using a lightweight hose and strainer. The cost of manufacture should not be great and it is considered that small parties of men on short patrols would be afforded greater protection from grossly contaminated water supplies, particularly in the tropics. The filter could also be used with advantage for emergency civilian supplies as stirrup pumps can be easily adapted to fit the filter. The output per hour of this stirrup pump type is about 50 to 60 gallons and could be used for small isolated groups where no large scale emergency clarification is available.

DISCUSSION.

The object of the tests was to show that simplification of teaching and operation could be accomplished by elimination of the Horrocks Test and substitution of a Fixed Dose Method of chlorination of water supplies in the field.

The Horrocks Test has been in operation for many years but has always been difficult to teach and the introduction of "parts per million" has tended to increase these difficulties. Confusion has arisen over Simple chlorination, Superchlorination, the Modified Horrocks Test and the selection of the correct colour for the indicator cup and it is considered the introduction of a standard method for filtered waters would be of great value. All unfiltered waters containing particulate matter should receive special treatment, probably 10 to 20 parts per million of chlorine, and heavily contaminated unfiltered waters would probably need 50 parts if the contact period is not to be increased.

The existing method of filtration and chloramination of bulk supplies at Bases is considered adequate with installations such as the Mobile Water Purifiers (3,000 g.p.h.) Mk. 1 and Mk. 2.

The accessory uses of the Horrocks Box can be eliminated or modified, e.g. deterioration and testing of W.S.P. prevented, by packing in sealed waxed containers. The designing of such an envelope should present no great manufacturing difficulties.

The Fixed Dose Method includes a colour test with orthotolidine as the indicator solution, this solution being cheaper and more stable than starch iodide solutions.

As regards relative costs of the methods, the introduction of superchlorination as the standard method of sterilization increased the cost of operation due to extra W.S.P. and the provision of taste remover tablets. The Fixed Dose method suggested would increase the general cost slightly but reduce the initial cost of apparatus, e.g. Limitester 13s. 9d., Horrocks Box £2 (these are civilian estimates

and under Army contract the prices are proportionately reduced). No space is available for a detailed discussion of costs.

It may be argued that the introduction of a Limitester into a Fixed Dose method complicates operation and teaching unnecessarily and merely substitutes a cheaper apparatus whilst increasing "running costs" but the suggested method can be taught to untrained men with no previous knowledge of water sterilization methods in one hour, whereas six hours are normally devoted to the teaching of the Horrocks Test and its accessory tests. Of the failures on Water Duty Courses over 90 per cent have little or no idea of the *interpretation* of the Horrocks Test but can perform the practical work of the test quite well.

The Limitester was introduced to ensure a direct *quantitative* as well as qualitative test at the end of the contact period which is of considerable importance in establishing confidence in the sterilization where there is no bacteriological control.

It will be noticed that 5 parts per million of chlorine are added to the water and only 4 parts per million removed by thiosulphate. This is based on the assumption that all natural waters, even after filtration, will deviate a little chlorine and the maximum residual chlorine figure to be expected after dechlorination is about 0.5 part per million. This approximates to the residual chlorine figure if simple chlorination is used with the Horrocks Box. The average person will describe this amount as "faintly chlorinous taste" and only a few will describe it as a definite taste of chlorine.

CONCLUSIONS.

The experiments have shown that a Fixed Dose of 5 parts per million of chlorine is extremely efficient in dealing with grossly contaminated waters. The importance of filtration has been clearly demonstrated, a grossly contaminated water being effectively sterilized in five minutes after filtration through metal filters using Kieselguhr as filter aid.

An attempt has been made to design a very light portable filter for small parties of men on patrol and it has been shown that a filter weighing considerably less than 20 pounds can effectively fill the water bottles of 50 men in fifteen minutes. The inclusion of such a filter is considered to be an essential in the equipment of small parties of men on patrol in tropical and sub-tropical areas for protection against tropical worm diseases and the removal of "clumps" of bacteria in grossly polluted waters.

SUMMARY.

The relative merits of the Horrocks Test and Fixed Dose methods of sterilization of water supplies in the field have been discussed.

An attempt has been made to simplify teaching and operation by substituting a Fixed Dose Method incorporating a chloroscope with a fixed glass to match 2 parts per million of chlorine using orthotolidine indicator solution.

Experiments were conducted with the proposed method using grossly contaminated waters and the importance of filtration demonstrated.

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The case for a very light portable filter to be used by small detachments of men on patrol has been put forward and a new design suggested.

It is proposed to perform comparative Field Tests with contaminated waters using (a) Horrocks Test Method and (b) Fixed Dose—Limitester Method and to compare the bacteriological efficiency of both methods with filtered and unfiltered water in a second paper.

We are much indebted to Colonel E. B. Allnutt, *M.C.*, for his helpful encouragement and for his permission to submit this article for publication

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THREE CASES OF ATYPICAL PNEUMONIA.

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Royal Army Medical Corps.

ACCORDING to recent annotations in the *Lancet* (1941, 1, 635) and the *Brit. Med. Journ.* (1941, 2, 233) cases of atypical pneumonia have been prevalent during the past months. These articles review the literature but unfortunately owing to present conditions it has been impossible to obtain all the references for personal study.

Scadding (*Brit. Med. Journ.*, 1937, 2, 956) originally described four cases of "disseminated focal pneumonia." The illness differed from classical lobar pneumonia in having an insidious onset with malaise, sweating and shivering. There was a cough, dry at first, later producing mucopurulent sputum and the signs in the chest, clinical and radiological, resembled pulmonary tuberculosis with coarse mottling in one or more zones of the lung. The white blood cells were normal or showed only a moderate increase, the polymorphs forming 70 to 80 per cent. The sputum contained a normal bacterial flora and was negative for tubercle bacilli. A moderate pyrexia lasted for four to five weeks and terminated by lysis. The signs in the lungs eventually cleared.

Murray (*New Eng. Med. Journ.* 1940, 222, 565) recorded 132 similar but milder cases seen during 1938-39. The pyrexia lasted only a week. Splenic enlargement was observed in some patients. He concluded that the condition was contagious with an incubation period of seven to eleven days.

Both Scadding and Murray emphasized that their cases were unassociated with an epidemic of common cold or influenza and suggested the possibility of a virus infection.

Since then Weir and Horsfall (*Journ. Exp. Med.*, 1940, 72, 595) have grown a virus, which produced pulmonary lesions in the mongoose, from the throat washings of four patients with "acute pneumonitis," while Pinkerton and Henderson (*Journ. Amer. Med. Assoc.*, 1941, 116, 807) have observed atypical pneumonia in two adults with toxoplasmosis. It is evident therefore that further investigation of the infecting agent is required.

Although atypical pneumonia seems to be a mild infection with a low mortality there is one real danger, namely, its confusion with pulmonary tuberculosis. This may lead to a wrong diagnosis and notification followed by the inevitable restrictions and, in the Forces, probable discharge from the Service.

The recognition of this condition is therefore of some importance. Hence this account of three such cases recently treated in this General Hospital.

Case 1.—No. 4275. Pte. V. G. Aged 21.

Admitted 27.4.41. Three days before he had felt ill with shivering and sweating. He now complained of pain in the chest on breathing.

He had had tonsillitis in early March, 1941, and influenza in the first week of April.

On admission the temperature was 103.8 ° F., the pulse-rate 92, regular, and the respiration rate 22. He was alert and in spite of the high temperature did not look seriously ill. On examination there were no definite abnormal findings.

He remained pyrexial (see Chart 1) and had frequent drenching sweats.

On 2.5.41 he developed a dry cough and for the first time signs were found in the chest, an impaired note with weak air entry and medium rales at the left base.

Four days later, 6.5.41, he started expectorating a moderate amount of mucopurulent sputum. Rales were now audible over the mid zone of the right lung. The spleen was found to be palpable on this day.

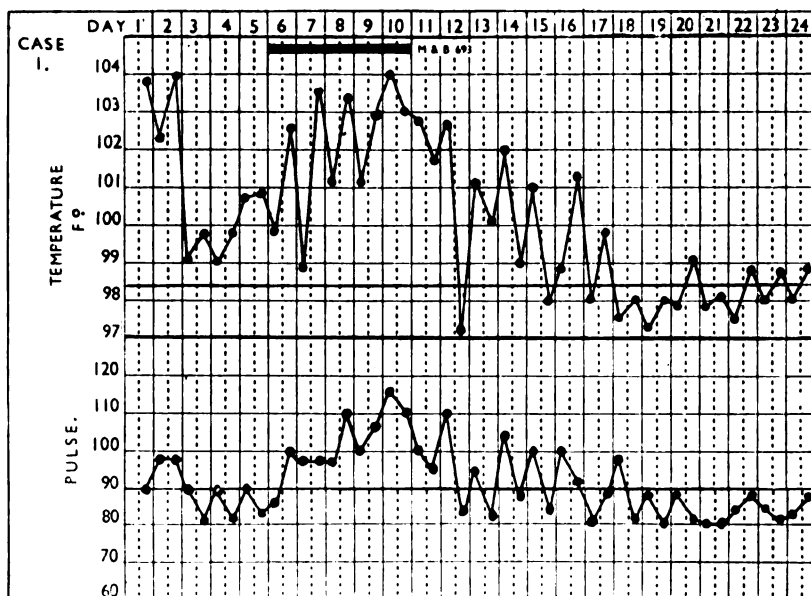


CHART 1.

Temperature and pulse chart, Case 1.

The temperature remained swinging at a high level, with frequent severe sweats, for seventeen days, when it subsided to a lower level but the patient did not become apyrexial until the thirty-fifth day of the disease. The spleen was palpable for two weeks. The signs in the lungs gradually cleared in the next four weeks and early in July, 1941, after three months in hospital, he was discharged to a convalescent depot.

Investigations.

Blood Counts.—2.5.41: Red cells 6,900,000 per c.mm. White cells 5,600 per c.mm. Polys. 77 per cent. 30.5.41: White cells 10,400 per c.mm. Polys. 73 per cent. 19.6.41: White cells 12,000 per c.mm. Polys. 59 per cent.

Widal Reaction and Br. abortus agglutininations.—7.5.41: Negative. 15.5.41: Negative.

Blood Culture.—12.5.41: Sterile after four days incubation.

Sputum.—Negative for tubercle bacilli on eleven occasions. It contained

only a scanty number of bacteria and grew equal numbers of *M. tetragenus* and pneumococci.

Blood Sedimentation Rate (Westergren).—1.5.41: 113 mm. in one hour. 18.5.41: 115 mm. in one hour. 1.6.41: 110 mm. in one hour. 1.7.41: 44 mm. in one hour. 14.7.41: 29 mm. in one hour.

X-rays of lungs (see fig. 1).—14.5.41: Diffuse, coarse mottling in the right mid and left lower zones. 4.7.41: Mottling has disappeared but there is some fibrosis at the left base.

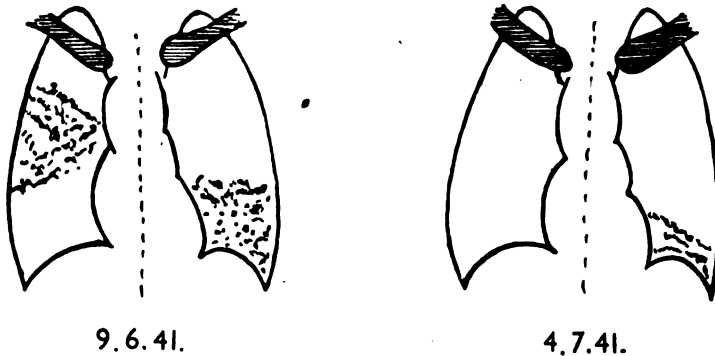


FIG. 1.—Case 1.

Comment.—When he was admitted there were already in hospital three cases of undulant fever and this was considered as a possibility. However the negative blood culture and agglutination reactions excluded it. Then, when the sign in the chest developed, pneumonia was diagnosed and he was given 30 grammes sulphapyridine in five days but with no effect on the temperature (Chart 1). The radiological findings were very suggestive of pulmonary tuberculosis but the failure to find tubercle bacilli in the sputum and the eventual resolution of the shadows, coupled with the complete physical recovery of the patient, made this diagnosis unlikely.

The splenic enlargement and the greatly increased sedimentation rate persisting for two months are interesting.

Case 2.—No. 4559. Pte. R. W. Aged 26.

Admitted 19.5.41. He had felt ill with shivering and sweating for the previous two days. On admission he looked ill and was sweating profusely. The temperature was 101° F., the pulse was grossly irregular with an apex rate of 120 and a radial rate of 100; the respiration rate was 24. On examination of the chest the note was impaired over the right mid zone with bronchovesicular breath sounds and scattered medium rales. The spleen was moderately enlarged. He was expectorating a small amount of green sputum.

It was thought he had a lobar pneumonia with auricular fibrillation. It was not possible to obtain an electrocardiogram but with 6 grains of digitalis leaf by mouth in the first twelve hours regular rhythm was restored and persisted.

He was also given 30 grammes sulphapyridine in five days but with no effect on the pyrexia and during this time the signs spread throughout the right lung.

The temperature settled by lysis in nineteen days, the spleen remained palpable for ten days but the signs in the chest persisted for six weeks. He was discharged

from hospital early in August, 1941, having been in ten weeks; no abnormal signs now to be found in the chest.

Investigations.

Blood Count.—22.5.41: White cells 8,600 per c.mm. Polys. 80 per cent.

Blood Culture.—25.5.41: Sterile after four days culture.

Sputum.—Negative for tubercle bacilli on three occasions. (No other organisms were looked for.)

Blood Sedimentation Rate (Westergren).—30.6.41: 67 mm. in one hour. 7.7.41: 53 mm. in one hour. 20.7.41: 12 mm. in one hour.

X-rays of Lungs.—10.7.41: Coarse mottling of the middle and upper zones of the right lung with thickening of the right interlobar septum. 6.8.41: The mottling has cleared. The thickening of the interlobar septum remains.

Comment.—Although the temperature was not so high this patient appeared more seriously ill than the previous one. Again sulphapyridine was ineffective, sweating was severe, the spleen was enlarged and the sedimentation rate was increased for some eight weeks. The X-ray findings resembled pulmonary tuberculosis.

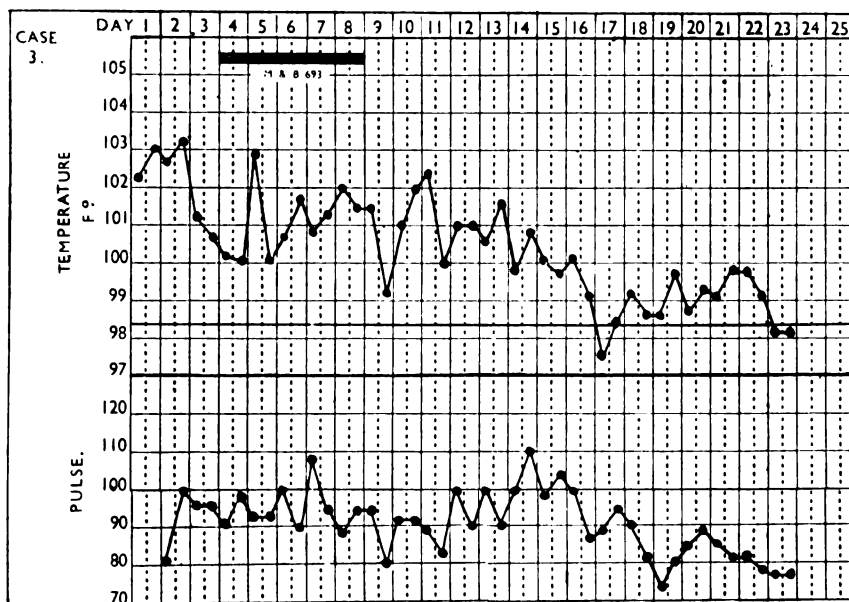


CHART 2.

Temperature and pulse, Case 3.

Case 3.—No. 4582. Gnr. A. P. Aged 27.

17.5.41 he was admitted to a Camp Reception Station with a febrile cold. As he maintained a pyrexia of 102° F. for four days he was transferred to the — General Hospital.

On admission on 20.5.41 the temperature was 102.2° F., the pulse regular 80, the respiration rate 22. He was sweating profusely but otherwise said he felt well. There was an impaired note over the middle zone of the right lung with bronchial breath sounds and medium rales. The spleen was palpable.

He had a cough but produced only a small amount of sputum. On clinical grounds a diagnosis of pulmonary tuberculosis was made but, when the sputum was reported negative for tubercle bacilli, pneumonia was considered and he was given 30 grammes sulphapyridine in five days but with no effect on the temperature.

Profuse sweating continued as long as he was pyrexial (Chart 2) and the spleen remained palpable for about one week. The temperature settled by lysis in twenty-three days. The signs in the chest however took two months to clear. He was discharged to a convalescent depot early in August, 1941.

Investigations.

Blood Count.—31.5.41 : White cells 8,200 per c.mm. Polys. 83 per cent.

Sputum.—Negative for tubercle bacilli on three occasions. On culture it grew *St. viridans* and *M. catarrhalis*.

Blood Sedimentation Rate (Westergren).—22.5.41 : 114 mm. in one hour. 4.7.41 : 55 mm. in one hour. 23.7.41 : 36 mm. in one hour. 1.8.41 : 33 mm. in one hour. 9.8.41 : 6 mm. in one hour.

X-rays of Lungs.—23.5.41 : Confluent coarse mottling in the mid zone of the right lung. 5.7.41 : Area of mottling smaller. 6.8.41 : Mottling has disappeared. There is some fibrosis in the right mid zone.

Comment.—This case closely resembles the first two. The clinical and radiological findings suggest tuberculosis, the sputum is negative for tubercle bacilli, the temperature does not respond to sulphapyridine, sweating is pronounced, the spleen is enlarged, the sedimentation rate is greatly increased for ten weeks and after three months in hospital the signs in the chest clear.

SUMMARY.

Three cases of atypical pneumonia are described.

The common features are :—

- (1) An illness of insidious onset.
- (2) Profuse sweating.
- (3) Signs in the chest clinically and radiologically suggesting pulmonary tuberculosis.
- (4) Splenic enlargement.
- (5) A white blood count within normal limits.
- (6) Sputum negative for tubercle bacilli and containing no significant organism.
- (7) A great increase in the blood sedimentation rate lasting for some ten weeks.
- (8) No response to sulphapyridine.
- (9) Progress : The pyrexia lasts for about three weeks and falls by lysis. The signs in the chest clear clinically in about two months but radiologically there is some residual pulmonary fibrosis.

My thanks are due to Majors J. R. Owen, J. Raban and C. H. G. Price, R.A.M.C., for assistance.

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CARCINOMA OF THE BREAST IN A SOLDIER.

BY MAJOR F. V. STONHAM,

Indian Medical Service.

CARCINOMA of the male breast though not rare is nevertheless far from common, especially in military surgical practice. The case about to be described is reported since it is of interest on account of the youth of the patient, the equivocal clinical signs, the accidental discovery of the tumour and the subsequent development of an adenoma in the opposite breast. The patient was a diminutive young soldier, 27 years of age, weighing 9 stone 2 pounds and 5 feet and 1½ inches in height. He was admitted to hospital on June 9, 1941 with laryngitis and treated by the laryngologist. On his recovery he mentioned that he had a small lump in his left breast which was annoying him. Further inquiries showed that he had first noticed it while bathing five months previously and that it was slowly increasing in size. One month after he first observed this tumour it became very painful and red after he had marched with his equipment, and it had increased slightly in size. He reported the fact to his medical officer and antiphlogistine was applied and he was given some pills to take. The nodule slightly diminished in size but subsequently it gradually became larger. It was always slightly tender and it invariably became painful when he wore web equipment or braces. There was never any discharge of any kind from the nipple. General health had always been good. On examination on July 24 a firm moderately hard nodule about the size of a hazel nut was felt directly under the left nipple which could be moved freely in all directions. It appeared to be attached to the nipple but to nothing else. The nipple showed no sign of retraction and appeared to be identical with its fellow. The nodule was slightly tender on pressure. No palpable glands could be felt in the axilla or elsewhere. On July 25 the tumour was removed through a small curved incision lateral to the areola. It was excised by severing its attachment to the nipple and cutting it out with some of the surrounding fatty tissue. There was no apparent attachment to the deeper tissues. On bisecting the mass it was found to consist of a homogeneous pinkish white tumour and the cut surface was flat. It could not be stripped from the capsule and the capsule was attached to the fatty tissue. One small yellowish spot was seen on the cut surface but the sensation on cutting into the tumour was not that characteristic of a malignant growth. In view of the history of comparatively recent inflammation it was decided to close the wound and await the results of histological examination. The pathologist reported carcinoma. Examination of the specimen under the microscope showed that the tumour consisted largely of dense fibrous tissue in which were epithelial cells arranged in acini surrounding clear spaces. The cells were large and deeply staining with large nuclei staining comparatively feebly. Most of the acini were lined with a single layer of cells but in some of them, especially to one side of the space, the cells were two, three or more

layers thick. In some of these the cells could be seen to have penetrated the basement membrane. In other parts of the section epithelial cells could be seen singly or in clumps in the fibrous tissue while the finding of similar cells in cuts across lymphatic vessels made the diagnosis beyond doubt. On July 30, therefore, the patient was submitted to radical mastectomy. This was done in the usual manner commencing from the axilla. The glands in the axilla appeared normal but the axilla was cleared out and the breast excised together with the sternocostal portion of the pectoralis major and the pectoralis minor and their fasciæ. The skin was liberally undermined to facilitate closure of the wound on account of the thinness of the patient. It was noted in this case that while the cephalic vein appeared to be absent the axillary vein consisted of two trunks of equal size which united just distal to the outer border of the first rib to form the subclavian. The division between the two parts of the pectoralis major was quite distinct but, on tracing the clavicular portion inwards, it was found to be proportionately larger than usual and a considerable part of its fibres took origin from the manubrium sterni.

• The patient made a good recovery and the wound healed well and he was sent for deep X-ray therapy. Later the patient complained of slight limitation of abduction of the arm above the shoulder on account of contraction of the scar. A plastic operation was then done by Major A. C. Taylor, I.M.S., in which he neutralized this by transposing Z flaps.

Four months later the patient returned with a small nodule under the opposite nipple. This had not been there before and the patient stated that he had first noticed it only a few days previously. The tumour was firm but not hard and about the size of a large pea. It was attached to the nipple but moved freely in all directions. This was promptly excised under general anaesthesia through a small curved incision lateral to the areola. There was a distinct capsule and histological examination showed the structure of an adenoma and there was no evidence of malignancy.

Six months after the original operation the patient was examined and there was no evidence of any secondary growth. He had been doing full duty as a gunner though he complained of becoming tired and of slight weakness in the left arm. The disability, however, seemed very slight and was probably exaggerated by the patient, who had spent the greater part of the previous six months in hospital.

Commentary.—The patient had always been undersized and, though his physical development was good and his sexual organs were normal, his stature and appearance suggested the possibility of some endocrine abnormality. This may not have been without influence on the development of neoplastic growth. It seems highly probable that the tumour under the left nipple commenced as an adenoma and became malignant consequent upon the chronic irritation already alluded to.

AN IMPROVISED METHOD OF EVACUATION OF CASUALTIES ACROSS RIVERS.

BY LIEUTENANT-COLONEL W. G. LOVE, M.B.,

Royal Army Medical Corps,

AND

SERJEANT-MAJOR J. A. HOGARTH, M.P.S.,

Royal Army Medical Corps.

THE problem of river crossings may arise in Field Ambulance work as, for example, when a Section has to go forward to deal with casualties in a Bridge Head or when it is necessary to evacuate casualties before bridging operations have finished. Various methods may be used for conveying stores and wounded, such as assault boats, rafts and improvised canoes. These have many disadvantages. Assault boats are not part of the G. 1098 equipment of a Field Ambulance and if required must be borrowed—a procedure which obviously takes time and thereby causes delay in operations. Rafts are cumbersome and take up a lot of valuable space and improvised canoes are at best slow. A method has been evolved in this Field Ambulance which has certain advantages—it is comparatively simple in that it requires no elaborate equipment. It can be used for conveying either personnel or stores and it is swift in action. A distance of 325 feet has been spanned without difficulty and a patient weighing $15\frac{1}{2}$ stone carried. The apparatus is described below.

Necessary Equipment.—This consists of two pairs of sheers, each leg being 7 feet long, each pair being joined by a strong bolt.

Wire rope (unserviceable balloon cable, obtained through Ordnance).

Pickets, wood, 4 feet long.

Two pulley wheels with brackets, fixed as in the diagram. (These were obtained from an old sliding door.)

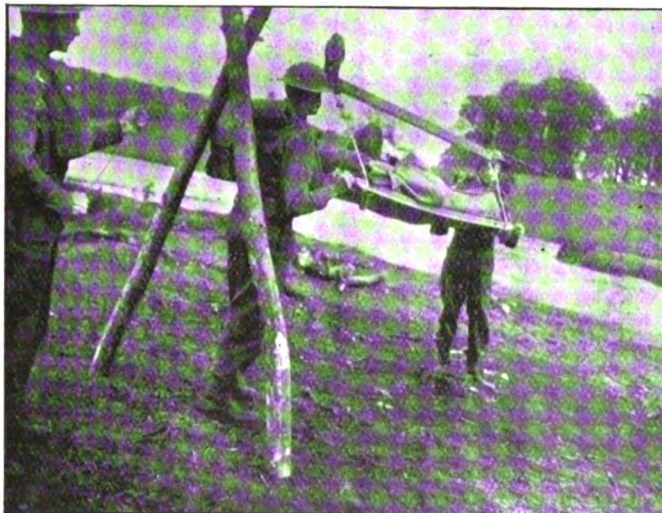
Rope “slings” (1 inch sisal rope).

Twine, coarse, for pulling.

Method of Use.—Two men cross the river, either by swimming or by Recce boat, taking with them the end of the light pulling rope (coarse twine). From the far shore they pull over one pair of sheers, which float, with pickets, axe and one end of the wire rope lashed to them. On both sides of the river the pickets are driven in about 18 to 20 feet from the river edge and the wire rope is pulled tight and securely fastened round the pickets. Trees if convenient may be used instead of pickets.

The two men on the far side then push their sheers into position; when this is done the sheers on the near side are erected. The erection of the sheers causes the wire to become taut.

The pulley is then placed on the wire and the light pulling rope attached to each end of the pulley to enable it to be drawn backwards and forwards.

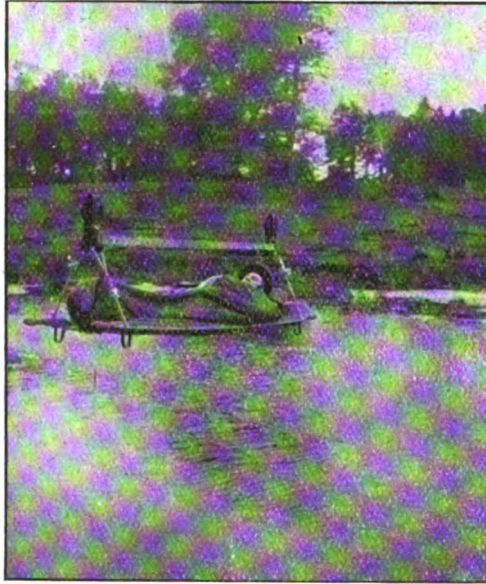


The stretcher is suspended from the pulley by 1 inch rope, slings being passed through the runners and the loops of the slings being passed over the hooks on the pulleys.

30 *An Improvised Method of Evacuation of Casualties Across Rivers*

By shortening one sling the stretcher can be maintained level despite any slope in the wire.

Advantages.—The apparatus takes up little space on a lorry. It is not very heavy, the whole being easily carried by three men. It can be used over most



rivers, gullies or down cliffs. It can be erected in twenty minutes. When erected, loading, crossing and unloading and return of replenishments can be done in two minutes.

The accompanying photographs illustrate the apparatus and its use.

We are indebted to Colonel S. D. Reid, A.D.M.S., for permission to submit this article for publication.

Editorial.

THE SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH. ANNUAL REPORT FOR THE YEAR ENDED DECEMBER 31, 1941.

WHENEVER we hear good news about military affairs in the Middle East we subconsciously expect good news also about one of our Imperial allies—or should not we call them our brothers?—who are bearing a proud share in the desperate effort and the final success. The forces of the Union of South Africa are always in the forefront of every operation for the defeat of the enemy and, we hope and trust, are destined to play a great part in his final destruction. The gallant South African contingent has suffered as we have suffered ; has triumphed when we have triumphed ; and is destined to make the name of the Union respected and dreaded by all who dare to claim that the right place for the rest of the world is under the heel of the so-called Herrenvolk. And have we not all, within the last few months, listened with admiration and affection to the voice of that great soldier and statesman, Field Marshal Smuts ?

It was with confidence, then, that we turned to the Annual Report of the South African Institute for Medical Research for the year 1941 to learn what had been undertaken or accomplished for the Medical Services of the Union fighting beside the British Army in Egypt and Libya and fresh from the triumphs of the Abyssinian Campaign. What we found was even more than we had anticipated. The South African Institute is playing a worthy part in the training of scientific personnel, the dispatch of men, equipment, dressings and drugs, the fitting out of units and the accomplishing of the many and various important tasks that fall to medical science during a great war. We can only touch on the subject in the brief words of an Editorial but we should like to refer all officers interested in the subject to a closer study of the Annual Report.

Leaving out that portion which deals with administration we pass at once to the paragraphs entitled “ War Work ” and which we are obliged to summarize only briefly though they deserve a much longer notice.

The Director, Dr. E. H. Cluver, as Honorary Director of Pathology in the Department of Defence, “ is in charge of a military detachment concerned with the training of Army laboratory personnel and the equipment of military laboratories.” The investigations undertaken by the Institute are given as follows : “ Syntheses of vitamins in the Union, using locally obtainable material ; production of vaccines and sera not normally prepared at the Institute such as typhus, influenza and yellow fever vaccine and gas gangrene serum ; preparation of fluid and dried human serum suitable for administration to men wounded in the field ; anti-malaria and anti-yellow fever measures such as the preparation and testing of mosquito repellents and surveying the geographic distribution of mosquito vectors in the Union and neighbouring territories ” ; and last but not least man-power research.

"Not only did the Institute by its training courses make staff available for the various military laboratories as they became established; it also undertook the equipping, largely from its own stores, of these laboratories."

"To date the Institute has entirely equipped six mobile field laboratories, two of which were presented to the South African Medical Corps by the Institute and four by the South African Red Cross Society."

Not only has the synthesis of vitamin C been accomplished but also the utilization of many natural sources of the vitamin has been investigated or employed. We read of the work which showed that orange juice concentrates rapidly lost their value through "darkening, decomposition and liquefaction" and that orange juice sweets are "more stable at lower temperatures and constitute a useful and convenient source of ascorbic acid." The guava has been found to be far the richest source of vitamin C in South Africa. "The stage of maturity of the fruit proved to be of great importance, maximum vitamin content being associated with the stage immediately preceding full ripeness." Guava sweets are very palatable and can be made to contain the required daily dose of ascorbic acid.

A representative of the Institute, Dr. J. H. S. Gear, was released from military duties in order to study the making of yellow fever vaccine in the United States under the Health Division of the Rockefeller Foundation and is, we understand, now engaged in production of this vaccine.

Blood transfusion has received great attention and Dr. E. Gaynor Lewis now makes for the Army a very satisfactory dried serum which merely requires the addition of distilled water in order to be ready for administration to a patient.

A repellent preparation to keep off attacks by mosquitoes has been made and tried. Coumarin and gum benzoin are the fixatives found to be best in order to enhance the repellent action of citronella. The preparation is as follows:—

Citronella	88 parts.
Coumarin	7 parts.
Gum benzoin	5 parts.

There is a valuable note on the preparation of super-concentrated diphtheria antitoxin, some interesting remarks on clinical cancer research by Dr. des Ligneris and, of course, the inclusion of the miner's diseases, silicosis and tuberculosis.

But what attracts us especially in the Report is the great and earnest attention that is being paid to war work and the training of South African personnel for the needs of battle.

Clinical and other Notes.

FURTHER EXTRACTS FROM LETTERS FROM A MOBILE NEUROSURGICAL UNIT IN THE WESTERN DESERT.

THE final bit of my last letter was written in Barce. A few days later we moved up to Benghazi and occupied the Colonial Hospital. There wasn't very much work but we had a case or two most days and a few very good ones. All remained quiet for a week; then friend Rommel began to get restive about January 21 and rumours began to fly. By that time we didn't take much notice of rumour being immunized by a surfeit. However, rumour grew stronger and, by Saturday, January 24, certain units began to leave the town. Word came in to be ready to beat it and, when Sub-Area H.Q. left, the A.D.M.S. sent word that there was a perforating wound of the belly coming in; or rather, he sent word a few hours later. In the meantime we were all packed up, so we arranged to do him in the civilian theatre. When the chap did arrive it turned out that he had only a superficial wound due to a money-box going off in a rubbish heap someone had put a light to. So we let it be.

Then, on the next day, Sunday, it was evident that something was in the wind for Fineberg, my batman, managed to get quite a lot of cigarettes from the bulk store N.A.A.F.I. which had previously refused to sell anything. As usual it wasn't possible to find out from anyone what was going on or where the Jerries were. People either didn't know or wouldn't say, or pretended they knew and talked nonsense. During the afternoon heavy explosions shook the town as dumps and installations were destroyed by the R.E.s—our pal, Colonel Butler, doing his stuff. On the whole the rumours had it that the Jerries were through Agedabia and were advancing in two columns, one on the coastal route, the other in the Msus region. Whether the rear corps had escaped or not seemed doubtful but they probably had.

Monday, January 26: The O.C. Indian F.A. (the unit to which we were then attached) had been in my room chatting. Though it was just about 11 p.m. the lights had not been turned out as usual. The O.C. had just gone when Corral, the right hand man of the A.D.M.S., — Indian Div., came in to look for him (the O.C.) with orders that we were to move immediately to Barce. We got to work and woke up the chaps and soon had the remaining stuff packed up. The F.A. started to move off at 1.30 a.m. and we followed them at the end of the column. We had not been able to move before as an A.A. unit occupied the road. One of the Indian lorries knocked over the gate at the exit from the hospital and about 4 feet of high wall and the gate-post of massive stones. This was spread more than half-way across the road and blocked it, so we got together a few chaps and cleared the stuff away. The blocks were so ponderous that it took 8 men to roll them over into the gutter. There was about a third of a moon which was setting

but gave enough light for us to get started down the road. Soon it clouded over but the rain kept off till we got to the top of the escarpment. An unpleasant drive. No lights, pretty black, especially when the moon went down, the road crowded with vehicles, many heavy ones and guns, and tired men driving. Recent rain had softened the earth shoulders of the road and made them sticky so that many vehicles came off the banks and we saw about half a dozen overturned. Parker drove very well. We scraped several lorries from time to time but did no damage except scratches and bending the sand-channel brackets. Reg. said later (he was next behind me) that there was a continuous stream of sparks flying. We all kept together pretty well. Many stops and we didn't get to the foot of the escarpment till dawn was breaking having been in a procession all the way. Here there was a long wait—nearly an hour—but no Jerry planes appeared. A flight of our fighters passed over at this time and we were glad to see them as the ascent of the escarpment here at Tocra is a good place to bomb.

Sudden stops in the night are awkward. One sees the shadow of a vehicle ahead. In front of it there may be one, or none, or a hundred. So one doesn't know whether to pass or not. As like as not, if a convoy has stopped for some time, some of the drivers go to sleep and don't move on when the road in front of them is clear again. So the only thing to do is to get out and have a look. Quite often the road is blocked by an accident or breakdown.

From the escarpment onwards all went smoothly. Nearing Baracca we saw where there had been a couple of direct hits on the road but no evidence of damage to vehicles. Outside Barce we were held up again while some chaps blew up an I-Ti tank by the side of the road. Waiting here also was a young gunner officer with a battery of 4.5s. He was worried as he had to get his guns into action nearby. What he was going to shoot at I can't think. Then on to the I-Ti hospital where we had been before with the Indian F.A., and we settled down in the same block. . . .

January 27.—Spent most of the afternoon sorting and packing various articles acquired in Benghazi and had a fine little spread out. Fairly chilly here, it being about 1,200 feet higher than Benghazi, but got a good fire going in the stove previously installed in a side-room off the ward. Disappointed not to find any of the pleasant aromatic wood to burn. A couple of cases this evening. One quite interesting: a bullet through the upper arm with paralysis of all three main nerves and a large hæmatoma. Turned out to be a nick in the brachial artery and the median nerve, the other nerves being paralysed by the effect of the pressure of blood. The two wounded Jerries we brought with us are all right. Oberleutnant — is a bit too healthy and competent-looking so I had him evacuated under guard. The other poor bloke has lost a foot so he can't run far.

January 28.—Orders to move back to Benghazi this a.m. Good-o. All the stuff I had lying about had to be shot back into the lorry. Took it easy going back and arrived about 3 p.m. They had a decent hole dug on the Tocra pass ready to blow the road when necessary. There wasn't much moving to-day. Just before descending the pass it rained heavier than I have ever seen before. I was leading at the time and heard a plane somewhere, but saw nothing. Apparently

it was a Jerry, according to the chaps behind, who went for the ditch in spite of the wet.

Arrived at the Colonial Hospital to find half a dozen casualties from the explosion of a mine about 14 miles away from Benghazi on a track leading south-east over which many vehicles had passed recently. Something of a mystery as to how it got there and why it went off. None badly wounded. The officer who was sitting over the wheel of the truck that set it off suffered no more than a ruptured ear drum. Reg. and George dealt with these in quick time as we had set up the theatre in an annexe to the main ward and were using our own stuff with two tables instead of one of the civilian theatres.

January 29.—Some police chaps came in to pinch — and not too soon. (— was an Italian surgeon left behind in the Colonial Hospital and I believe a 5th columnist.) To my mind they have gone the wrong way about things. They should have rounded up all the enemy nationals at the start and released them as occasion warranted. As it is they left most of them free and have arrested them in dribbles from time to time after any damage they proposed to do was done. — was in the middle of an operation, an amputation on an Arab injured some days ago by a grenade. A guillotine of the forearm, badly done. His right eye also was destroyed and full of pus so I finished it off with an evisceration and dealt with the next case, another forearm amputation. Shortly after two more Arabs were brought in with oldish wounds; one with the hand blown off also. This was fairly recent. The man was in good shape and walked in by himself and allowed the dressing to be removed, none too gently, by a nun. The other was a little child of perhaps 7 years with many wounds. The right arm was blown off towards the wrist and the wound filthy, 4 or 5 days old by the look of it. The poor mite had also lost both eyes, the left penetrated and full of pus, the right destroyed perhaps by some still active disease. There were also other wounds and the child looked as if she would soon die. The nun was by no means gentle in removing the dressings and hushed the child impatiently and impersonally when it cried out feebly. Sickening. I arranged to do both cases in the afternoon and went off for a bite of food. No sooner was lunch over than the A.D.M.S. came in with orders to beat it with despatch. He said the — Brigade was coming through the town at 7 p.m. We got away at about 3 p.m. and in spite of something of a queue on the road made quite good time to Barce where we had been ordered to go once more. Quite a lot on the road—lorries, guns, carriers, a few tanks, mostly Valentines. As we left the town an Arab came quietly up to my lorry which was stopped in a jam and said, pointing south, "Tripoli." At this time the road was lined with Arabs and it was clearly known that we were making off.

I had sent Parslow on ahead, towing Pritchard's lorry, as his distributor was cracked. Reg. got away ahead of me and Bob was last. I went on ahead as fast as possible, as I thought the lorry on tow would never get up the escarpment at Tocra, but we didn't overtake them till we got to the top of the pass which they had managed under their own steam—a good effort. We carried on behind them into Barce lest they should have further trouble. Along the top of the pass and

all the way to Barce there were many guns (25 pounders mostly) and S.A. armoured cars and some tanks. Most of this lot seemed to be continuing on the road past Barce (the north road). In Barce I happened to catch sight of Corral and stopped to ask him what was afoot. He told us to proceed to Giovanni Berta (another 100 miles). As we were ahead of the F.A. and I was first of our lot, apart from the three-tonner on tow, this bit of information had to be got to the rest of my vehicles as well as the F.A. So I first went on to the hospital which my 2 three-tonners had been told to make for. We filled up from the reserves and sent the 2 lorries (one still on tow) off to wait on the southern road just outside the town. I had decided to go that way as there was a hell of a lot of traffic on the northern road and a few bad turns round which a lorry on tow could not be negotiated. Then I went back to the cross roads west of Barce. There was a frightful jam. On getting the new orders from Corral I had sent George and the serjeant (who were in my lorry) back to the cross roads to stop our people till I got back. By this time it was dark but the moon was two third and not too much cloud. Reg. had turned up. He had had trouble with the petrol feed. He got it fixed up with a bit of rubber tubing ; then Anderson poured water into the tank instead of petrol. However he had managed to get so far and was still tinkering with the engine. Reg. was sure Bob was lost for good for he was convinced that the Tocra pass had been blown shortly after he reached the top as he had observed a large explosion in that direction. Since his kit had, in the hurry, been put on Bob's vehicle this set him back somewhat. By this time the Colonel had turned up and I passed on the message from Corral. We found Bob at last about a mile back in the midst of a dreadful jam. He had seen or heard nothing of blowing the road (we heard later that the enemy cut the road some miles north of Benghazi about an hour after we got through).

When George heard we were going by the south road he made the alarming suggestion that Rommel had probably sent up a column from the desert and had cut it further on. However, as soon as I had got back to the cross-roads after leaving the hospital, I had sent Parker back to tell Parslow and Pritchard to beat it for all they were worth by the southern route so our boats were burnt anyway.

By this time Bob had emerged from the jumble of traffic and he went off through the town, Reg. following, and I was last in the one vehicle that had given no trouble that night. At the bottom of the Barce pass we came upon Bob and Reg. both stuck (I should say that on this run it was no good trying to keep in convoy. It was pretty dark, the roads had been full, and one couldn't recognise a vehicle over about 2 yards. So each lorry was told the exact rendezvous and instructed to make its own way at its best speed). Bob got going again and I towed Reg. up the escarpment. My vehicle seemed to feel the strain a bit so we ran off all the reserve water, which reduced the load by about 1,200 pounds. At the top of the pass Reg. got away under his own steam. A mile or so further we found Bob in trouble again. He had stopped for something or other, had decided to fill up, and had filled up with water ! After about an hour's messing about they gave the handle a twist and off she went again. They were running on their reserve tank and had to fill up every 25 miles. After a

bit the stops became more frequent and finally they stopped altogether so we took them in tow as we got sick of hanging about in the rain and cold wind (about 3,000 feet up at that spot). We got to Berta, our destination, at about 5.15 a.m. By this time the moon had gone down and we couldn't see a thing. There was no sign of the building where we had been told to park. After a bit of snooping round we found a side track and ran off the road and waited there till it was light. With the morning we could see the spot clearly across a small wadi. We had noticed a small road just west of where we had stopped which led straight to the rendezvous across a bridge over the wadi. The bridge was down with a 20-foot drop straight into the wadi bed.

We stayed at this spot for two or three days; then, when the Jerries got rather close again, we went back nearly to Tobruk in one hop. Three days later orders to return to the Base arrived and we reached Cairo on February 6. It appears that Corps and Army had been out of touch with us for a week or more. The last report they had had was from the O.C. of a F.A. that had been in Benghazi and left on January 25. Then there was a rumour started by someone that we had retired to Barce and next day were last seen moving west at high speed. In point of fact the situation was always pretty well under control and we were never hard pressed.

The lesson is obvious. Every medical unit in the Field, especially F.A.s and C.C.S.s, should be equipped with wireless.

Please tell B—— that I enjoyed the Penguin book, "English Diaries of the 17th and 18th Centuries," immensely. It was indeed kind of her to send it. The only trouble about getting good books of this sort is that they are so quickly read. There is a scheme here whereby we pool books in the Mess Library. "English Diaries" has made a rapid round. . . .

NOTES ON MOBILE SURGICAL UNITS IN MIDDLE EAST.

. . . Well, apart from questions of detail, here are some of the points that do not appear to have always been taken into consideration :

1. Mobile Surgical Units of all kinds should be flexible in themselves and should be handled freely and flexibly. They should be equally capable of working at the Base (at General Hospitals) or in the Forward Areas and they should be distributed according to the needs of the situation. If a particular corps is suffering heavy casualties a dozen teams may be needed for a few days. At other times a couple of teams can easily cope with all the work. And in very quiet times there will be very little work at all in the Forward Areas ; at such times most teams will be better employed at the Base. Should a battle be about to start it is easy enough to push up a dozen teams in a couple of days. There is no need to keep all these surgeons idle in the Forward Areas for weeks before and after a battle. Whenever possible each team should be specially trained in some specialty that will serve to keep it out of mischief in quiet times. In battle each team can do general work as required.

2. *The question of holding sections.*—Is the team to care for its own patients or not ? If so, is it to carry its own tentage and other necessary equipment and

to have the necessary extra personnel? My own view is that the team should not be required to carry accommodation for patients. It means extra transport and work when the team's energies should be devoted solely to treatment of patients. But I do think that the team should be responsible for the post-operative care of its patients and should have its own nursing orderlies trained to this work.

3. *Personnel of Surgical Teams.*—There is room for two types of team in the Forward Area; the extremely mobile team running one table, and the rather less mobile team running two tables, but of much more than twice the capacity and very economical in personnel and equipment.

4. *What is the ideal theatre accommodation?*—It is not safe to count on finding buildings. Should operations be done (a) in a tent? (b) in a pent-house built round a lorry? or (c) inside specially equipped lorries? The great advantage of operating within the vehicle is speed of getting to work and of packing up. And packing up is far more important. You may have plenty of time to pack up and beat it if the enemy is approaching or the first warning may be a shell in the camp. And five minutes may be all the time one has to get going for tanks move fast. The trouble about the few units possessing actual operating lorries is that the vehicles are far too small. (In Kellar's unit the anaesthetist told me that it was sometimes necessary to anaesthetize the patient before he could be got inside the vehicle and placed on the table.) Do you remember my mentioning to you certain vehicles used as Mobile Map Printing Units? These are the answer to the theatre on wheels. They are expandible so that the floor space can be quickly doubled. Such a vehicle, plus a similar vehicle fitted as a sterilizing van which could be joined back to back, would give space enough to run two tables concurrently, with the advantages of this system.

The alternative to such mobile theatres is, I think, the specially designed pent house tent built round the lorry, on the lines of our own. The lorry itself does not require elaborate fittings. Such as there are should be made accessible from the outside so that, when the pent-house is erected round the lorry, equipment and stores are readily and easily available. There is an Australian Mobile Surgical Unit van which embodies certain good points on these lines. The main feature about the construction of the vehicle internally is that all the fittings, cupboards, shelves, etc., are made of metal or metal-covered ply-wood, combining lightness and slimness with great strength and freedom from warping.

Trailers are a mistake for they are the very devil on narrow roads and in the desert. On narrow roads they won't go round the bends and in the desert the bumps are always causing the couplings to snap. . . .

5. *Other points concerning transport.*—It is very bad policy to overload vehicles. In bad country it is unsafe. If a vehicle is loaded to the roof, packing and unpacking take twice as long and, if a particular article is required in a hurry, it is always at the bottom of the pile. . . .

Were I to have the designing of my own ideal unit, I should plump for the expandible lorries, one as theatre, the other as sterilizing room, and the two-table system with two surgeons. And I think that if that were not obtainable I would have the single team operating lorry for the most advanced sporadic work and the two-table pent-house arrangement for the heavier work a little further back . . .

FOREIGN BODY (SHRAPNEL) IN THE SPHENOIDAL SINUS.

BY MAJOR A. BROWNLIE SMITH,

Royal Army Medical Corps.

AND

MAJOR A. M. WRIGHT THOMSON,

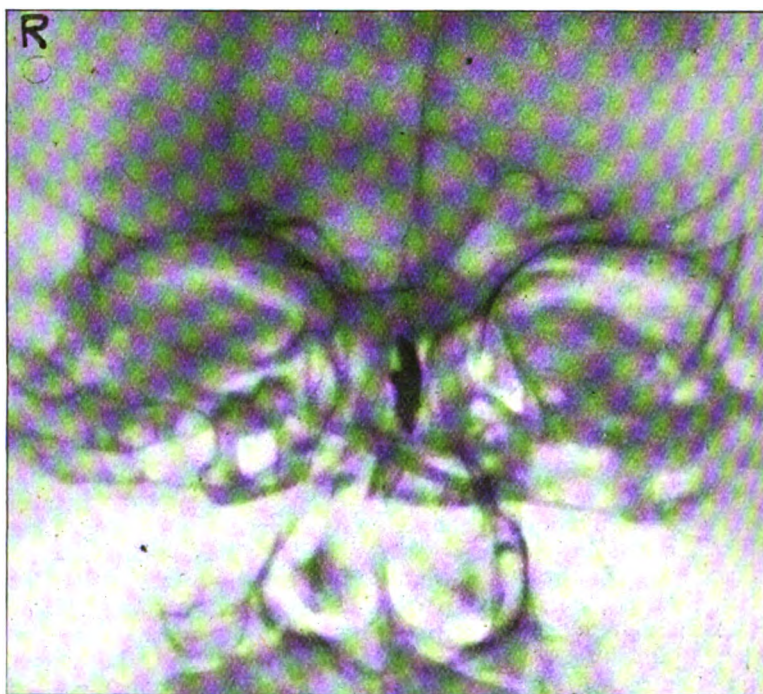
Royal Army Medical Corps.

It is unusual for a foreign body to be found in the sphenoidal sinus and, on that account, the notes of the following case may be of interest.

A German corporal was admitted to hospital on November 30, 1941, with a severe injury of the right eye which had been sustained at least four days previously. He also had a small wound of the right forearm and of the right arm. On admission it was found that the right eye had been damaged beyond repair and, two days later, it was decided to remove the residue. After the patient had been anæsthetized examination revealed that very little of the eye remained and the operation was confined to scraping out the remnants of the uveal tract. In the course of the operation the optic nerve was not disturbed in any way. The patient made a good recovery from the operation but, on December 15, he was handed over to the care of Major Crofton as he had developed signs of a meningeal infection with neck stiffness and a positive Kernig's sign. Lumbar puncture produced a turbid fluid in which the white cells numbered 440 per c.mm. but no organisms were found on culture. Of the white cells 60 per cent were lymphocytes while 40 per cent were polymorphonuclear leucocytes. He was treated with tablets of M and B 693 and soon began to improve, the neck stiffness gradually passing off and his general condition becoming much better. Once he had recovered from his infection an X-ray examination was made of his skull when a piece of shrapnel was observed in his sphenoidal sinus. This foreign body was lying in the posterior part of the sinus in the middle line and it was not possible to be sure if it were contained in the right or the left sinus. It was decided that it would be safer if the foreign body were removed and this was attempted through the right orbit. Under combined local and general anæsthesia (the nose was packed with gauze soaked in equal parts of 10 per cent cocaine hydrochloride and 1:1,000 adrenalin and some 1 per cent planocaine was injected into the orbital tissues while an intratracheal anæsthetic was administered in addition) a vertical incision was made on the medial wall of the orbit just within the lid margins. When the orbital fat was retracted the orbital plate of the ethmoid was exposed and an opening made into the nose through the ethmoidal cells with punch forceps. There was considerable difficulty in retracting the orbital fat but a curved tongue depressor was found to be the best instrument for this purpose. Also, the margins of the orbit curtailed the amount of retraction which was possible and the exposure obtained was not good. There was little hæmorrhage and, as the pharynx had been packed off, one did not require to worry about the inspiration of any blood. The foreign body must have entered the sphenoidal sinus through the orbit but no evidence of the tract of the missile was found. The front wall of the right sphenoidal sinus was removed with punch forceps; there was a little mucopus in the sinus but no foreign body. A small pinhole was observed in the septum between the two sinuses but it looked much too small to have admitted the piece of shrapnel. This septum was removed with punch forceps and a piece of shrapnel, $1\frac{1}{2}$ cm. long by $\frac{1}{2}$ cm. wide, was found lying in the posterior part of the left sinus.

There was a little mucopurulent discharge in the sinus but this infection appeared to be a very mild one. Other than the small pinhole in the partition between the two sphenoidal sinuses no track of the missile was found but, as the operation was performed on January 27, 1942, two months after the original injury, it is possible that this may have been obliterated by fibrous tissue. The incision through the tissues of the medial wall of the orbit was stitched and the patient returned to bed. He made an uninterrupted recovery without complications of any kind. When the dressing was removed he seemed surprised that his friends in the ward should assure him that no scar was visible !

The right orbital approach to the left sphenoidal sinus is one which must be rarely used and which cannot be recommended ! In this case the shrapnel must



have entered the sinus through the orbit and it was thought that a better chance of removing it would be obtained by approaching it through the original track but no evidence of this was found, other than the small pinhole in the septum between the two sinuses. Also, in the absence of stereoscopic radiographs, it was not possible to state definitely whether the foreign body was lying in the right or the left sphenoidal sinus. As the right eye had been enucleated one thought that a good exposure would have been obtained through the orbit but this was not so ; the orbital fat produced a great deal of difficulty and the amount of retraction which was possible was considerably limited by the bony margins of the orbit. On considering the case in the light of the difficulties which were

encountered it would possibly have been better to have approached the sphenoidal sinus through an incision in the skin to the medial side of the inner canthus, the incision which is used in the external operation on the ethmoidal labyrinth and in Chiari's approach to the sphenoidal sinus.

We wish to record our indebtedness to Colonel D. C. Scott, *O.B.E.*, for his permission to publish this case.

AN IMPROVISED DARK GROUND CONDENSER.

BY PRIVATE S. YOUNG,

Royal Army Medical Corps.

STITT (1939) describes a method for the adaptation of an ordinary microscope condenser to dark field illumination. It is stated, however, that this is suitable only for low power examination of dark ground fields and is unsuitable for examination by oil-immersion lens.

The purpose of this note is to describe a method by which an ordinary condenser can be adapted for high power work. The microscope was a Spenser, and the method is as follows :—

A piece of plasticine is pressed into an even, circular disc and placed on the under-surface of the condenser lens, leaving a clear border of 3 mm. If necessary the condenser is then adjusted so that contact can be made between its upper surface and the under surface of the preparation for examination.

A stop is improvised by rolling a length of tin-foil tightly around a thin metal rod about 3 mm. in diameter. Sufficient tin-foil should be used to ensure that, when completed, the stop just fits accurately into the lower part of the oil immersion objective. Carefully slide the tightly wound tin-foil off the rod and insert into the lower part of the oil immersion objective, taking particular care that it is in an absolutely vertical position. Reassemble the objective and screw into position. The apparatus is now ready for use and, by suitable adjustment of the diaphragm, a quite adequate dark ground field can be obtained.

This method has been successfully used in the examination of exudates for *Treponema pallidum*.

My thanks are due to Colonel J. F. W. Sandison, *O.B.E.*, *M.C.*, for permission to publish this note.

REFERENCE.

STITT and CLOUGH (1939). "Practical Bacteriology, Hematology and Animal Parasitology," Ninth Edition.

, HÆMATURIA DURING SULPHAPYRIDINE ADMINISTRATION.

BY MAJOR N. H. MARTIN,

*Royal Army Medical Corps,**Pathologist,*

AND

MAJOR H. AGAR,

*Royal Army Medical Corps,**Surgical Specialist.*

THE increasing use of the sulphonamide drugs and the tendency to give them in more massive dosage for some conditions suggests that hæmaturia, a well-recognized complication of their exhibition, is too little stressed. The focal renal damage which this hæmaturia indicates and the fact that when gross it may be associated with urinary suppression requiring drastic remedial treatment places this complication on the same level of importance as agranulocytosis among the hazards associated with sulphanilamide therapy.

CASE REPORT.

A soldier aged 24 was admitted to this hospital with symptoms of acute appendicitis. A grossly inflamed appendix was removed under spinal anæsthesia and although there was a little peritoneal exudate it was not sufficient to warrant



drainage. Eighteen hours after operation his temperature rose to 103°F. and his respirations to 28. Clinical examination suggested some bilateral basal pulmonary congestion and the medical specialist advised the administration of sulphapyridine. The patient received 14 grammes in the next forty-eight hours. At

the end of thirty-six hours, after only 10 grammes, he began to complain of bilateral lumbar pain and there was some paravertebral tenderness. The aetiology was not immediately appreciated but the next morning he had characteristic renal colic and passed about 5 oz. of dark smoky urine. The specimen was dispatched to the laboratory at once. The report read as follows:

S.G., 1.023; pH 6.7; Colour, dark brown "smoky" urine; Albumen ++; Sugar -; Benzidine reaction (or blood) +++; Deposit, amorphous debris containing numerous large dagger-shaped crystals, their morphology suggesting a sulphanilamide derivative (see fig.).

The urine was subsequently centrifuged in bulk and the deposit elutriated with water. The crystals so obtained were sufficient to enable a microchemical analysis to be made. This showed them to be at least 95 per cent sulphapyridine in the acetyl form. In view of the initial report sulphapyridine was stopped at once, the patient having received 14 grammes in all. Fluid intake was increased and alkalis given till the urine was markedly alkaline. Thirty-six hours from cessation of the drug and the institution of treatment the urine was free of blood. Two weeks later laboratory investigations could demonstrate no impairment of renal efficiency.

DISCUSSION.

Robertson (1938) reported a brisk hæmaturia in a boy of 14 who was being treated with sulphapyridine. The boy received a total of 30 grammes in four days. The hæmaturia continued for forty-eight hours but when the drug was withdrawn cleared up rapidly. Since then cases have been reported sporadically both in England and America. Smith and Needles (1939) in fifty cases of pneumonia treated with sulphapyridine reported one case of focal nephritis which they attributed to sulphapyridine. Pepper and others (1939) reviewing 277 cases of pneumonia treated with sulphapyridine found hæmaturia in 5.4 per cent of cases, and Backhouse (1939) in an interesting article on Pneumonia among the Melanesians found hæmaturia in 12 per cent of 109 cases. It must be pointed out that it was difficult to ensure adequate fluid intake in these cases and that the urines were extremely acid. More recently MacKenna (1941) in a V.D. clinic has reported a 1:600 incidence of macroscopic hæmaturia among patients who were receiving 22 grammes of sulphapyridine in forty-eight hours. While with a general hospital in France one of us observed more than 300 patients treated for gonorrhœa who received a dose of 14 grammes of sulphapyridine in four days and, though it was specifically watched for, hæmaturia was never observed.

Examination of the literature suggests that there are wide limits of individual renal tolerance. Our patient probably had not received more than 10 grammes when his symptoms first appeared, not a very massive dose. Many cases of pneumonia receive far higher doses without hæmaturia. We have in this hospital estimated the percentage of the drug excreted in the urine as the acetylated compound. We found that it varied between wide limits and have observed cases in which as much as 45 per cent of the excreted drug was in the acetyl form. No doubt further investigation would give still higher figures. A point which is of interest emerged from these estimations. The concentration of the acetylated drug in the urine of many patients receiving sulphapyridine was far above the limits of solubility one would expect from *in vitro* experiments. Thus the Harvard

School give the solubility of acetyl sulphapyridine in urine of pH 7.1 to 6.3 at 37.5° C. as up to 33 mg. per 100 ml. *in vitro*. We had patients whose fresh urine contained 66 mg. per 100 ml. That is exactly double the *in vitro* maximum.

Two explanations suggest themselves. The acetyl derivative may be conjugated with other substances, and glycuronic acid has been put forward as such a substance, or the acetyl derivative may be present in a supersaturated solution. It is of interest that one sometimes sees acetyl sulphapyridine crystallizing out from urines in test glasses as fine acicular crystals on the sides. If the urine was supersaturated in the renal pelvis then one would expect an increased tendency to intra-pelvic crystallization if there were present any nidus such as blood, organic debris or inorganic crystals. We think such circumstances may be the initiating factor in many cases. Werner (1939) has devised a relatively simple technique for testing for sulphonamides in the urine and those interested will find his paper well worth study.

Restriction of fluid intake in patients on sulphapyridine will increase the risk of hæmaturia and it seems unwise to let the fluid intake of such patients drop below 3 pints a day. Alkalinization has been suggested but should not be relied on as a prophylactic measure. If severe hæmaturia occurs administration of the drug should be stopped, fluid intake should be increased by all available means and the urine kept alkaline. In case of suppression of urine immediate retrograde catheterization with pelvic lavage may be required.

We wish to thank the Officer Commanding No. — General Hospital for permission to publish this paper.

We also wish to thank Mr. Mahaffey of Queen's University, Belfast, for the microphotograph.

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 PEPPER and OTHERS (1939). *Amer. Journ. Med. Sci.* **198**, 22.
 ROBERTSON (1938). *Lancet*, September 24, 728.
 SMITH and NEEDLES (1939). *Amer. Journ. Med. Sci.*, **198**, 19.
 WERNER (1939). *Lancet*, January 17, 18.

Current Literature.

CIANI, G. Le Brucellosi in Maremma: diffusione, epidemiologia e profilassi. **[Brucella Infection in Maremma, Italy.]** *Igiene mod.* 1939, v. 32, 220-48. [Summary taken from *Vet. Bull.* 1491, July, v. 11, No. 7, 428-9. Signed U. F. RICHARDSON.]

Recent investigations into the prevalence of undulant fever in the Maremma district of Tuscany have shown that the incidence of this condition is greater than that of the typhoid fevers. It is suggested that this is not a new development but that previously cases had escaped diagnosis. The

present paper describes the epidemiological investigations which have been undertaken, leaving the question as to the type of organism responsible to be dealt with in a future article on the bacteriological results obtained in the laboratory.

It is claimed on epidemiological grounds that the reservoir host is the sheep. The disease is more prevalent in rural than in urban populations, and is apparent mainly in tenant farmers who are not sheep owners. The majority of cases occur in adult males, and there is a marked seasonal prevalence, outbreaks commencing in January, reaching a peak in May, and then almost completely ceasing.

Attempts to trace the source of infection led to the conclusion that the majority of cases were due to the consumption of fresh cheese made from unheated sheep's milk, whilst a few cases were thought due to eating uncooked vegetables from sites contaminated by infected sheep, and other cases were ascribed to transmission of the infection by flies. Cases in veterinary surgeons and shepherds are ascribed to cutaneous infections acquired in parturition or in removing retained placentas from either cattle or sheep.

It is pointed out that nomadic sheep are brought to the Maremma area in September and taken away again in June. A first lambing occurs at the end of September and a second one in February, but the disease is not associated with the period of lambing or abortion. Cheese making commences in November but, since the incubation period is sixteen to twenty days, few cases of human disease occur till January.

As the milk supply is greatest in May it is then that the disease becomes most prevalent. It was found that about 44 per cent of sheep gave positive reactions to the agglutination or brucellin tests, and that infected flocks sometimes showed a morbidity of 80 to 98 per cent.

Dogs, horses, cattle, goats and fowls in contact with infected sheep gave a high percentage of positive reactions to the agglutination test and in both species of ruminants abortion commonly occurred. In examination of flocks of sheep, a test of the sheep-dog's blood proved very reliable as an indication of the presence of infection. Pigs were also found to give positive reactions to the agglutination test, and to abort as the result of infection, but the disease, though spreading from pigs to sheep, did not readily spread in the reverse direction.

Ciani concludes that sheep serve as the principal reservoir of infection in this area and, though the other domestic animals may contract the disease, they do not present the same danger to human beings. It is recommended that educational propaganda be undertaken to advise the population as to the nature of the disease, and to emphasize the danger of eating fresh cheese made from unheated sheep's milk or uncooked plants from infected pastures. It is thought that cheese is free from danger forty days after manufacture, but it is recommended that all milk should be pasteurized, and that milk from infected flocks should be boiled. Suggestions are made for the examination of flocks, using the brucellin test, and for the isolation of those found free

from infection. It is pointed out that after one or two abortions sheep appear to recover, and it is believed that such animals present little danger to man; it is suggested that the protection given by the injection of a killed vaccine may be sufficient to prevent any heavy contamination of milk or pastures. It is even suggested that attempts should be made to immunize the human population by oral administration of vaccines, as it appears that shepherds acquire immunity without developing disease symptoms.

Reprinted from "Bulletin of Hygiene," Vol. 16, No. 10, 1941.

DULANEY (Anna Dean) & STRATMAN-THOMAS (Warren K.). Specific Nature of Complement Fixing Antibody in Malaria as demonstrated by Absorption Tests.—*Proc. Soc. Experim. Biol. & Med.* 1940. June. Vol. 44. No. 2. pp. 347-349.

The authors have confirmed the results of Coggeshall and Eaton that a specific complement fixation reaction in malaria employing *Plasmodium knowlesi* antigen can be obtained. A positive reaction is correlated with the presence or recent presence of demonstrable parasites in the blood. It has also been shown that Wassermann negative patients who receive induced malarial infections remain Wassermann negative though they become malaria positive. Absorption experiments carried out on bloods which are both Wassermann and malaria positive indicate that each reaction depends upon distinct and correlated antigens.

C. M. W.

Reprinted from the "Tropical Diseases Bulletin," Vol. 38, No. 7, 1941.

MANSON-BAHR (Philip). The Prevalent Diseases of Libya. *Lancet.* 1941. Feb. 22. pp. 253-255. With 3 figs. [13 refs.]

This paper cannot be abstracted, but attention is drawn to it here on account of its value to those who may find themselves in N. Africa. The prevalent diseases are mentioned, and the author gives not only the findings of other workers, but also the results of his own extensive observations on these conditions as they affected troops in N. Africa during the last war, laying stress not so much on the classical appearances as on those features which might confuse medical officers not accustomed to dealing with the diseases in question. He deals with malaria, especially subtertian, which is prevalent in the Fezzan, leishmaniasis, relapsing fever, typhus, sandfly and dengue fevers, deficiency diseases, dysentery, helminthic diseases, venereal diseases and desert sore. The common venomous animals are referred to. Modern lines of treatment are indicated. The paper is concise but is full of essential information; it should be available for reference to every medical officer working in N. Africa.

C. W.

Reprinted from the "Tropical Diseases Bulletin," Vol. 38, No. 7, 1941

Reviews.

THE DENTAL TREATMENT OF MAXILLO-FACIAL INJURIES. By W. Kelsey Fry, M.C., M.R.C.S., L.R.C.P., L.D.S. R.C.S.Eng., P. Rae Shepherd, L.D.S. R.C.S.Eng., Alan C. McLeod, D.D.S. Penn., B.Sc. Dent. Toronto, L.D.S., R.C.S.Eng., and Gilbert J. Parfitt, M.R.C.S., L.R.C.P., L.D.S. R.C.S.Eng. Oxford: Blackwell Scientific Publications, Ltd. 1942. Pp. xvi + 250. Price 16s. net.

The subject matter of this volume is an excellent and concise assembly of a series of lectures, bedside clinics and theatre demonstrations on the treatment of maxillo-facial injuries.

Dental surgeons are all fully conversant with the general treatment in peace time of jaw injuries. When, however, confronted with the extensive facial injuries of modern warfare, involving our own particular field, how often do the thoughts pass through our minds as to how to commence treatment, what area should we confine ourselves to, and thus avoid trespass on the surgeon's domain and, most important, what should our final aims be? The authors have admirably answered these vexed questions.

Chapters I-IV, dealing with Anatomy, Fractures and Results of Displacements, Diagnosis and Radiology, with excellent explanatory drawings and illustrations condensed into 50 pages, thoroughly cover the subjects and will well repay close study.

Some blunt but very common-sense opinions are expressed in Chapter V. The Dental Surgeon who naturally leans towards 100 per cent results may be inclined to think them revolutionary. We must, however, not forget our objective or the time factor during the present strenuous period through which we are passing.

The authors wisely stress that the most important single factor in reaching a decision as regards choice of treatment should always be common sense based upon fundamental principles. The methods of treatment described are, of course, those in practice at East Grinstead, where immobilization, whenever possible, is effected by the "Cap Splint" method for cases with teeth standing. The application of Double Gunning Splints, Circumferential and Alveolar wiring are demonstrated for edentulous cases.

The modifications of standard methods described are very ingenious. The whole technique of Cap Splinting has been brought to such perfection and so simply described that Dental Surgeons could not be better advised than to regard it as the last word on this method of immobilization.

In "Methods of Immobilization," pages 100 and 101, comparison of Cap Splint or wiring, the authors are unfortunately inclined to strike a harsh note. There appears to be a tendency to describe the advantages of Splints, and the

disadvantages of wiring. Both methods have their uses and results achieved depend entirely on the use of suitable materials and the skill of the operator.

The all-important subjects, Radiology and Anæsthesia, are admirably dealt with in Chapters IV and XIV.

Throughout the book the reader is confronted with a very important fact, so often not stressed and so aptly described by the authors, that it is a wounded human being, and not a fractured jaw with a patient attached, who is under treatment.

The book is a handy size, very well indexed, and no Dental Surgeon who has mastered the contents should find himself at a loss when confronted with facial injuries of the most severe type.

Nothing of importance has been neglected from First Aid to the discharge of the patient from hospital and, if a cliché may be forgiven, it supplies a long felt want, not only to the Dental Surgeon but also to the Plastic and General Surgeon.

J. W.

MEDICAL JURISPRUDENCE AND TOXICOLOGY. Seventh Edition, By John Glaister, M.D., D.Sc. Edinburgh: E. & S. Livingstone. 1942. Pp. viii + 671. Price 28s. net.

The publication of a seventh edition indicates the deserved popularity of this book. The new edition has been completely recast and shows extensive revision. Recent relevant legislation has been included, the tables are now presented in a clearer form and much useful new material has been added. In spite of this the length has been reduced by some seventy pages which enhances the value of the book as unnecessary information, such as details of quantitative chemical analysis, has been omitted.

A few points may be criticized. The description of the sulphonamides is brief considering the widespread use of these drugs (anuria is not mentioned as a complication), the statement (p. 624) that *B. enteritidis* is a commensal in the healthy human intestine and the omission of a detailed list of illustrations. These are, however, only of minor importance and do not detract from the value of the book which can be highly recommended to medical students and all practitioners who are interested in forensic medicine.

R. W. F.

A HISTORY OF TROPICAL MEDICINE (based on the Fitzpatrick Lectures, Royal College of Physicians, London, 1937-38). Two Volumes. By Sir H. Harold Scott, C.M.G., M.D., F.R.C.P.Lond., D.P.H., D.T.M.&H.Camb., F.R.S.E. London: Edward Arnold and Co. 1942. Pp. xxiii + 1219. Price 63s. net.

The first edition of this work was reviewed at length in the *Journal* of May, 1940, and references were made to the chapter on "The Army" in the Editorial of the December, 1942, number.

As in numerous other cases enemy action has destroyed many copies of the original edition of 1939. The second impression now produced has given an

opportunity of including an Appendix of 52 pages on recent advances and consideration of historical matter. Subjects dealt with in this Appendix include *Plasmodium ovale*, naturalistic methods of malaria control, India and yellow fever, cryptic yellow fever areas, distribution and control of sleeping sickness and the ætiology of epidemic dropsy, to mention just a few.

There will be many readers for whom this History will revive memories of their early (and sometimes obscure !) struggles in tropical medicine. We hope there will be in the future many readers from amongst those officers now gaining their experience and making their contribution in the Medical Services with the Forces overseas.

These two volumes will enlighten all medical work in the tropics.

Notices.

AN ANTISEPTIC SULPHANILAMIDE POWDER.

ATTENTION has been drawn in recent literature to the risk of anaerobic infection from locally-applied sulphonamides. To obviate this risk a sterile preparation of sulphanilamide is now issued by Burroughs Wellcome & Co. as " Wellcome " brand Sterilized Sulphanilamide Compound. This is a free-flowing, mobile powder consisting of finely-divided sulphanilamide with 5 per cent of zinc oxide ; the latter facilitates complete sterilization without aggregation of the sulphanilamide particles, and also retards absorption of the compound from the site of application, thus providing a more prolonged local chemotherapeutic action. The product is issued in bottles of 15 grammes.

VITAMINS IN MEDICAL PRACTICE.

A SECOND edition of Messrs. Roche Products Ltd. booklet entitled " Vitamins in Medical Practice " has been published.

It has been enlarged and new illustrations of diseases associated with vitamin deficiency added. The booklet is intended to present a concise survey of the vitamins, detailing their discovery, chemistry, natural sources, units and human requirements, as well as physiological functions and therapeutic indications. Coloured insets indicate the progress made in the elucidations of the vitamins and also the illustration of Harris and Ray's test for vitamin C reactions in the diagnosis of vitamin C deficiency using dichlorophenolindophenol tablets.

In normal times, " Vitamins in Medical Practice " would have been issued free, but in accordance with the Paper Control Regulations, a charge has to be made, which is placed at 9d. per copy ; all the money collected in this way, however, will be set aside for one or two medical charities or the Red Cross.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in **duplicate** through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps, and articles of a non-scientific character, may be accepted for publication under a *nom-de-plume*.

All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps," will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

A free issue of twenty-five reprints, or any lesser number to the extent applied for, will be made to contributors of Original Communications and of twenty-five excerpts, or any lesser number as above, in the case of Lectures, Travels, Clinical and other Notes, and Echoes of the Past. Such free reprints or excerpts will, however, only be sent to those specifying their wish to have them and a request for same should accompany the article when submitted for publication, stating the number of reprints or excerpts required.

Reprints or excerpts, additional to the above, can be furnished on payment if specially ordered at the time of submission of the article for publication.

Except as in the first paragraph above, communications in regard to editorial business should be addressed—"The Editor, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, A.M.D.5, War Office, Whitehall, S.W."

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ADVERTISEMENTS.

Communications regarding Advertisements should be addressed—
G. STREET & CO., LTD., 8, SERLE STREET, LONDON, W.C.2.

THE COMMON COLD PROPHYLACTIC TREATMENT

SCIENTIFIC investigation has so far offered little light on the ætiology of colds, though it has shown that the so-called "run-down" state, which appears to favour this infection, is often directly due to a condition of border-line nutritional deficiency. Since the discovery of the essential part played by the vitamins in protecting the body against many types of ill-health, much work has been concerned with the probable relation between vitamin deficiency and susceptibility to infections generally.

While the common cold is apparently due primarily to a virus infection which causes congestion of the mucosa of the respiratory passages, the more distressing manifestations result from a secondary invasion by a variety of organisms. This invasion is greatly facilitated by changes in the epithelium of the mucosa, such as are known to result from hypovitaminosis A. As a factor in preventing colds, therefore, the maintenance of the integrity of the respiratory epithelium by ensuring an adequate intake of vitamin A would appear to be logical.

That vitamin C also may directly affect resistance to infection is indicated by recent observations.

In 1938¹ it was suggested that, when the Vitamin C level of the blood is high, streptococci are less likely to be found in the tonsils, and, if present, are seldom virulent. Infections cause a greatly increased demand for Vitamin C, so this vitamin may be a factor needed in the production of immune bodies in the serum.

COMPENSATING FOR DIETARY DEFICIENCIES

There is a volume of clinical evidence to show that a sufficient intake of all the vitamins important in the human economy is essential for an optimal state of health. Where dietary deficiency exists, it is seldom limited to any single factor so that vitamin therapy should be directed towards improving the general nutritional state, and so raising the resistance of the body. Complevite Tablets were designed to meet the need for a single supplement providing all the necessary vitamins and mineral salts. Complevite Tablets contain vitamins A, B₁, C and D with calcium, available iron, and phosphorus in amounts sufficient to meet the deficiencies of these factors in the average everyday dietary.

A course of Complevite offers the best safeguard against malnutrition, and, prescribed during the winter months, may be found in practice to lower greatly the susceptibility to the common cold, and to influenza and respiratory infections generally.

¹J. Pediat (1938) 13,322

100% = The full daily requirement

Average Dietary Deficiency Complevite supplies (approx.) †

VIT. A	VIT. B ₁	VIT. B ₂	VIT. C	VIT. D	Ca	Fe	P	VIT. A	VIT. B ₁	VIT. B ₂	VIT. C	VIT. D	Ca	Fe	P	VIT. A	VIT. B ₁	VIT. B ₂	VIT. C	VIT. D	Ca	Fe	P
3700 i.u.								4000 i.u.								4000 i.u.							
	150 i.u.								200 i.u.								200 i.u.						
		350 i.u.								400 i.u.								400 i.u.					
			250 i.u.								300 i.u.								300 i.u.				
				0.35 gm.							0.35 gm.								0.35 gm.				
					0.002 gm.						* 0.012 gm.								* 0.012 gm.				
						0.18 gm.						0.55 gm.								0.55 gm.			
							TRACE MINERALS																

*The iron in Complevite exceeds the calculated deficiency expressly to combat the nutritional anemia so common in children and in women of child-bearing age.

† At time of manufacture.

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23 Upper Mall, London, W.6.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS

Corps News.

JANUARY, 1943.

NEW YEAR HONOURS LIST.

K.B.E. (Military Division)

Maj.-Gen. Henry Letheby Tidy, M.D.,
F.R.C.P.

C.B. (Military Division)

Maj.-Gen. John Alexander Manifold,
D.S.O., M.D., D.P.H., Honorary Physician to the King.

O.B.E. (Military Division)

Lt.-Col. (temp. Col.) Frederick McKibbin, M.B., B.Ch.

M.B.E. (Military Division)

Capt. Desmond Alan Dill Montgomery,
M.B., B.Ch., R.A.M.C.

Capt. John Anderson Strong, M.B.,
B.Ch., R.A.M.C.

O.B.E.

Miss I. E. Kinkead, R.R.C., Principal
Matron, Q.A.I.M.N.S.

R.R.C. (1st Class)

Miss A. Rowlands, Matron,
Q.A.I.M.N.S.

Miss A. C. G. Dady, Matron,
Q.A.I.M.N.S.

Miss E. Nieuwerf-Newcourt, Matron,
Q.A.I.M.N.S.

Miss A. M. Price, Matron,
Q.A.I.M.N.S.

Miss A. Murphy, Matron, Q.A.I.M.N.S.

Miss D. A. Thorpe, Matron,
Q.A.I.M.N.S.

Miss M. Husband, Principal Matron,
T.A.N.S.

Miss K. M. A. Simpson, Matron,
T.A.N.S.

Miss B. Tweddle, Matron, T.A.N.S.

R.R.C. (2nd Class)

Miss F. C. Coleing, Asst. Matron,
Q.A.I.M.N.S.

Miss J. G. Porteous, Asst. Matron,
Q.A.I.M.N.S.

Miss M. O. Chace, Sister-in-Charge,
Q.A.I.M.N.S.R.

Miss J. E. F. Stewart, Sister-in-Charge,
Q.A.I.M.N.S.R.

Miss E. W. Joynt, Sister-in-Charge,
Q.A.I.M.N.S.R.

Miss B. C. Shafto, Sister-in-Charge,
Q.A.I.M.N.S.R.

Miss V. Brocklebank, Sister-in-Charge,
Q.A.I.M.N.S.R.

Miss J. Cowie, Sister, Q.A.I.M.N.S.R.

Miss G. E. Wilson, Sister,
Q.A.I.M.N.S.R.

Miss N. Simcox, Asst. Matron,
T.A.N.S.

EXTRACTS FROM THE "LONDON GAZETTE."

Dec. 15, 1942.—The KING has been graciously pleased to approve that the following be MENTIONED in recognition of gallant and distinguished services in the Middle East during the period November, 1941, to April, 1942:—

Commands and Staff.

Maj.-Gen. D. C. Monro, M.B.,
F.R.C.S., K.H.S. (14493), late R.A.M.C.
Brig. (local) S. Smith, M.B., F.R.C.P.,
K.H.P. (14376), late R.A.M.C.

Royal Army Medical Corps.

Brig. (temp.) F. G. A. Smyth, *C.B.E.*,
M.B. (8763) (since died).

Brig. (local) N. St. J. G. D. Buxton,
M.B., F.R.C.S. (25883).

Col. (temp.) D. C. Scott, *O.B.E.* (8839).

Lt.-Col. F. R. H. Mollan, *M.C.* (5666).

Major (temp. Lt.-Col.) D. Bluett, M.B.
(35617).

Major (temp. Lt.-Col.) G. M. Heiron,
M.B. (47897).

Major (temp. Lt.-Col.) A. G. Henderson,
M.D., F.R.C.P. Edin. (33838).

Major (temp. Lt.-Col.) J. W. Hirst,
T.D. (25284).

Major (temp. Lt.-Col.) R. Lees, M.D.,
F.R.C.P. (127138).

Major (temp. Lt.-Col.) R. Marnham,
M.S., F.R.C.S. (133609).

Major L. F. Richmond, M.B. (47948).

Capt. (temp. Major) I. Aird, M.B.,
F.R.C.S. Edin. (77284).

Capt. (temp. Major) J. B. Bunting,
(72157).

Capt. (temp. Major) J. M. Corall, M.B. (73583).

Capt. (temp. Major) J. G. Elmslie, M.B. (88702).

Capt. (temp. Major) R. S. Hooper, M.B., M.S. (127733).

Capt. (temp. Major) C. McT. Hopkins, M.B. (119747).

Capt. (temp. Major) R. J. Kellar, M.B. (67327).

Capt. (temp. Major) H. M. R. Knight (104682).

Capt. (temp. Major) J. B. M. Milne, M.B.E., M.B. (78906).

Capt. (temp. Major) W. H. Purves, M.B. (78680).

Capt. (temp. Major) J. C. Reed, M.B. (56276).

Capt. R. D. I. Beggs, M.C., M.B. (108102).

Capt. B. A. McL. Brown, M.B. (119612).

Capt. J. W. A. Dennis, M.B. (127671).

Capt. J. H. Gibson, M.D. (78710).

Capt. J. D. P. Graham, M.D. (175380).

Capt. D. R. Hood (64424).

Capt. C. R. Houghton, M.B.E. (127197).

Capt. H. M. Kelsey, M.B. (101240).

Capt. G. T. L. F. Morris (115209).

Capt. C. G. Pantin, M.B. (86949).

Capt. W. J. Shannon, M.B. (135658).

Lt. (Qr.-Mr.) A. S. Goddard, M.M. (144051).

Lt. (Qr.-Mr.) R. Luckwell (178560).

7254529 W.O.1 (S.M.) C. L. Barrett.

2201161 W.O.1 (S.M.) A. A. Brookes.

7250230 W.O.1 (S.M.) W. T. Moore.

7256053 W.O.1 (S.M.) R. Needham.

7256321 W.O.2 (Q.M.S.) (actg. W.O.1 (S.M.)) F. J. Rule.

7258678 S./Sjt. (actg. W.O.2 (Q.M.S.)) J. E. Proud.

7260498 S./Sjt. (actg. W.O.2 (Q.M.S.)) A. J. Shaw.

7358046 S./Sjt. W. L. Andrews.

7258726 S./Sjt. M. J. Gregory.

7517781 Sjt. (actg. S./Sjt.) N. Leatherbarrow.

7264292 Sjt. (actg. S./Sjt.) F. M. Solan.

7262345 Sjt. (actg. S./Sjt.) A. M. Thompson.

7347813 Sjt. A. G. Bain.

7377720 Sjt. H. Brotherton.

7361975 Sjt. W. F. Eves.

809637 Sjt. H. J. Hammon.

7345098 Sjt. R. McIntosh.

7523661 Sjt. H. Mitchell.

7354572 Sjt. J. P. O'Brien.

7369394 Sjt. F. H. Slater.

7262772 Sjt. W. Storey.

7261511 Cpl. (actg. Sjt.) L. Brown.

7517491 Cpl. G. T. Gordon.

7519419 Cpl. G. Wickens.

7381971 Pte. (actg. Cpl.) K. S. Green.

7342883 L./Cpl. E. A. Brophy.

7358006 L./Cpl. W. A. Gerrard.

7342843 L./Cpl. T. Mycock.

7516772 L./Cpl. N. S. Wightman.

7388751 Pte. C. R. Briggs.

7369060 Pte. R. G. J. Coman (died of wounds).

3189069 Pte. J. G. Ireland.

7259918 Pte. B. Pritchard (Now Pte., Intelligence Corps).

5096280 Pte. R. J. Simpson.

7521763 Pte. E. J. Stoffel.

The Army Dental Corps.

Capt. J. N. Mansbridge (106053).

7536289 S./Sjt. W. Rice.

7538840 L./Cpl. D. E. Capes.

Queen Alexandra's Imperial Military Nursing Service.

Miss B. Jones, A.R.R.C., Matron (206239).

Miss I. I. Scruton, Sister (206465).

Territorial Nursing Service.

Miss D. E. Nicol, Sister (215021/1).

Erratum. Order of the British Empire.

Dec. 22.—The particulars of the following appointment is as now shown and not as shown in the undermentioned *Gazette*:—

The *London Gazette* No. 35396, dated December 30, 1941, page 7329:—

Capt. Edward Leonard Fawsett (168043), Royal Army Medical Corps.

Erratum.—The *London Gazette* of December 30, 1941, page 7356.

For Lt. T. S. H. Silvester, Indian Medical Service substitute Capt. T. St. J. H. Silvester (122038) Royal Army Medical Corps.

Dec. 29.—The KING has been pleased to grant unrestricted permission for the wearing of the following decoration which has been conferred upon the undermentioned Officer in recognition of services in the cause of the Allies.

Decoration conferred by

THE KING OF THE HELLENES.

Order of George I, 4th Class, with Swords:—

Lt.-Col. Michael Balfour Hutchinson Ritchie, D.S.O., O.B.E., M.B. (4687), ret. pay, late Royal Army Medical Corps.

Dec. 31.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the Middle East:—

The Military Cross.

Capt. John Colin Bishop, M.B. (87209), Royal Army Medical Corps (Birmingham).

Capt. Morris Crawford Fulton (110063), Royal Army Medical Corps.

Capt. Aymer Robert Wilson, M.B. (115106), Royal Army Medical Corps (Edinburgh).

Capt. John William MacMillan, M.B. (76035), Royal Army Medical Corps (Calstock, Cornwall).

Lt. David Tetley Milnes (218894), Royal Army Medical Corps (Worksop, Notts.).

The Military Medal.

7345098 Sjt. Robert McIntosh, Royal Army Medical Corps.

7519419 Cpl. Gilbert Wickens, Royal Army Medical Corps (Charlwood, Surrey).

7366203 L./Cpl. James Hunter Yates Auld, Royal Army Medical Corps (Aberdeen).

7370350 Pte. James Smith McKenzie, Royal Army Medical Corps (Buckie, Banff).

Royal Army Medical Corps.

Dec. 18.—The promotions of the undermentioned Lt.-Cols. are antedated as follows :—

T. H. Sarsfield (15326), Feb. 15, 1942.

H. T. Findlay (1845), Feb. 19, 1942.

L. M. Rowlette, D.S.O., M.C. (15674), Mar. 1, 1942.

J. H. C. Walker, M.B. (8449), Mar. 26, 1942.

M. B. King, M.C., M.B. (10752), Apr. 13, 1942.

(Temp. Col.) W. W. S. Sharpe (5820), Apr. 25, 1942.

W. H. A. D. Sutton (5041), Apr. 26, 1942.

R. S. Dickie, M.B. (15779), Apr. 30, 1942.

A. C. Taylor (15752), May 1, 1942.

L. S. C. Roche, M.C. (4377), May 13, 1942.

A. R. Oram, M.C., M.B. (15691), May 14, 1942.

C. L. Emmerson (15651), May 27, 1942.

F. A. R. Hacker (10652), June 4, 1942.

(Temp. Col.) G. D. Gripper (15701), June 29, 1942.

(Temp. Col.) G. T. Gimlette, M.B. (13199), July 2, 1942.

W. Millerick, M.C. (15786), July 12, 1942.

C. A. Slaughter (8133), Aug. 8, 1942.

H. A. Boyle, M.B. (15757), Aug. 15, 1942.

T. E. B. Beatty (8620), Aug. 20, 1942.

D. Crellin, M.C. (1645), Sept. 16, 1942.

T. P. Buist, M.B. (15700), Sept. 26, 1942.

J. A. Crawford, M.B. (18355), Oct. 7, 1942.

(Temp. Col.) G. T. Garraway (17974), Oct. 22, 1942.

Major (temp. Lt.-Col.) T. S. Law (22297) to be Lt.-Col., Nov. 3, 1942.

Dec. 22.—Lt.-Col. (actg. Col.) L. A. J. Graham (15677), having attained the age for retirement, is retained on the Active List, supern. to the estab., Dec. 21, 1942.

Capt. (temp. Major) S. G. M. Lynch, M.B. (40052), to be Major, Dec. 23, 1942.

Dec. 29.—The undermentioned Short Service Officers are apptd. to permanent commns., retaining their present seniority :—

Sept. 30, 1942.—Capt. R. L. Townsend, M.B. (72163).

Oct. 22, 1942.—Capt. (actg. Major) T. M. Fowler, M.B. (73563).

Capt. G. F. Valentine, M.B. (73564).

Capt. (temp. Major) P. J. Fox, M.B. (73580).

Capt. (temp. Major) T. A. Pace, M.D. (73585).

Capt. R. A. Bond, M.B. (73586).

Oct. 23, 1942.—Capt. J. A. Manifold (70111).

Oct. 24, 1942.—Capt. C. McNeill, M.B. (72154).

Oct. 27, 1942.—Capt. D. D. Maitland (73589).

Dec. 1, 1942.—Capt. S. Ward (73587).

Jan. 5, 1943.—The undermentioned Lt.-Col. to be Col. :—

Temp. Col. R. W. Galloway, D.S.O., M.B. (5839), from R.A.M.C., Dec. 19, 1942, with seniority Apr. 1, 1940.

Lt.-Col. W. E. Adam, M.C., M.D. (3031), ret. pay, at his own request, reverts to the rank of Major, Nov. 27, 1942, whilst so empld.

Jan. 8.—Maj.-Gen. J. W. West, C.B., C.M.G., C.B.E., LL.D., M.B., M.Ch. (5746), ret. pay is apptd. Col. Comdnt., Nov. 23, 1942, vice Maj.-Gen. H. Ensor, C.B., C.M.G., C.B.E., D.S.O., M.B. (9805), ret. pay, deceased.

Memoranda.

Temp. Lt.-Col. (actg. Col.) F. R. Boland, F.R.C.P. (128259), Consulting Physician is granted the local rank of Brig., Nov. 14, 1942.

Regular Army Reserve of Officers.

Dec. 15, 1942.—Col. G. H. Richard (5433), late R.A.M.C., having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs., July 28, 1942.

Jan. 8, 1943.—Lt.-Col. E. L. Reid, M.C. (102852), having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs., Jan. 1, 1943.

Capt. (Brev.-Major) F. K. Tomlinson, M.B., ceases to belong to the R.A.R.O. on account of ill-health, Jan. 9, 1943.

Memorandum.

Major E. L. Reid, *M.C.* (102852),
R.A.M.C., is granted the rank of Lt.-
Col., Jan. 1, 1943, on ceasing to be empld.

Jan. 12.—Capt. (temp. Major) M. McG.
Russell, *M.D.* (3018), to be Bt.-Major,
Jan. 11, 1943, under the provns. of Art.
168, Royal Warrant for Pay and Promo-
tion, 1940.

TERRITORIAL ARMY.

Dec. 29, 1942.—Col. (temp. Brig.) E.
M. Cowell, *C.B., C.B.E., D.S.O., T.D.,*
M.D., F.R.C.S. (2804), to be Dir. Med.

Servs. and is granted the paid actg. rank
of Maj.-Gen., Nov. 11, 1942.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING
SERVICE.

Jan. 8, 1943.—Sister Mrs. R. Bell (*née* Gordon) (206168) retires July 31, 1942, and receives a gratuity.

PRISONERS OF WAR.

Malaya.

T./Lt.-Col. Barrett, St. C. E. J.
T./Lt.-Col. Benson, H. C.
Lt.-Col. Cornelius, W. H.
Lt.-Col. Craven, J. W.
Lt.-Col. Hennessey, E. M.
T./Lt.-Col. Harvey, W. G.
T./Lt.-Col. Huston, J.
T./Lt.-Col. MacFarlane, L. R. S.
Lt.-Col. Middleton, D. S.
T./Lt.-Col. Mulvany, D. P. F.
T./Major Anderson, F. E.
A./Major Anderson, H. J.
A./Major Bennett, V.
T./Major Bloom, P. M.
A./Major Burgess, R. C.
T./Major Bull, J. W. D.
Major Dowell, W. H.
A./Major Garlick, G. H.
T./Major Gillies, D. W.
T./Major Gilloran, J. L.
A./Major Graves, P. R.
T./Major Hambury, P. B.
T./Major Henderson, H.
T./Major Hutchin, K. C.
A./Major Lendon, N. C.
Major Macdonald, J. R.
T./Major Marsden, A. T. H.
Major Malcolm, J. W.
T./Major MacGarry, P. V.
A./Major O'Driscoll, C. G.
A./Major Pemberton, T. M.
T./Major Phillips, W. J. E.
A./Major Reid, J. A.
A./Major Riddell, G. S.
T./Major Routley, P. E. F.
A./Major Webster, F. L.
Capt. Adam, A. G.
Capt. Aldridge, B. H. M.
Capt. Barber, A.
Capt. Benson, D.
Capt. Brown, R. W. W.
Capt. Butterfield, F. E.

Capt. Campbell, C. F.
Capt. Campbell, S.
Capt. Chapman, W. A. W.
Capt. Chester, A. W.
Capt. Chilton, C. D.
Capt. Christian, D.
Capt. Cruickshank, E. K.
Capt. Clark, J. F.
Capt. Cormack, T. R. S.
Capt. Cowen, H. W.
Capt. Churchill, M. H.
Capt. Davies, D. O.
Capt. Diver, J.
Capt. Eastwood, A. K.
Capt. Falk, J. A.
Capt. Findlay, G. I. G.
Capt. Frankland, A. W.
Capt. Franks, R. M.
Capt. Gawn, H. D. T.
Capt. Gibson, G. A. F. R.
Capt. Glover, J. A.
Capt. Gotla, D. W. F.
Capt. Hamilton-Gibbs, J. S.
Capt. Hecht, C.
Capt. Hendry, J.
Capt. Jackson, W. L.
Capt. Ledingham, J.
Capt. Leigh, E.
Capt. Lennon, R. W.
Capt. Lennox, B.
Capt. Lewis, C. V.
Capt. Lodge, J. D.
Capt. Longbottom, D.
Capt. Markby, E. H.
Capt. Marshall, G. K.
Capt. Marshall, T. E.
Capt. Matheson, K. C.
Capt. Mayne, B.
Capt. Meldrum, C. B.
Capt. Moss, J. E.
Capt. McConnachie, J. D.
Capt. McDonald, W. H.
Capt. McNeilly, J. C.

Malaya (contd.)—

Capt. Nairnsey, C.
 Capt. O'Sullivan, M. T.
 Capt. Pantridge, J. F.
 Capt. Phillips, E. R. S.
 Capt. Pitt, C. S.
 Capt. Protheroe, T. S.
 Capt. Richardson, J.
 Capt. Roy, A.
 Capt. Roulston, J. K.
 Capt. Seed, P. G.
 Capt. Sefton, L.
 Capt. Silman, H.
 Capt. Snell, E.
 Capt. Stone, L. D.
 Capt. Street, W. J.
 Capt. Sutherland, A. W. G.
 Capt. Todd, K. W.
 Capt. Williams, E. D. H.
 Capt. Young, R. G. B.

Lt. Braham, M. G.
 Lt. Chopping, P. T.
 Lt. Cuthbert, R. H.
 Lt. Dawson, R. L. G.
 Lt. Donaldson, W.
 Lt. Drummond, R. G.
 Lt. Dunlop, A. L.
 Lt. Emery, E. J.
 Lt. Lopez, G. A.
 Lt. Markowitz, J.
 Lt. Petrovsky, C. C.
 Lt. Sykes, J. C. T.
 Lt. Vardy, E. C.

North Africa.

Capt. Hooper, F. J. W.

W. Desert.

Lt. Gottlick, J.

DEATHS.

KILLERY.—On Dec. 18, 1942, in Salisbury, Rhodesia, Lt.-Col. St. John Brown Killery, R.A.M.C., retired. Son of Brigade Surgeon St. John Killery, A.M.D., he was born in Dublin, Sept. 3, 1868. Educated at St. Bartholomew's Hospital he took the L.R.C.P. and M.R.C.S. in 1892 and entered the Army as Surgeon Lieutenant July 29, 1893, being promoted Surgeon Captain July 29, 1896. He was Surgeon Captain Royal Horse Guards (the Blues) from May 4, 1904, till Feb. 28, 1907. Promoted Major R.A.M.C. Mar. 1, 1907, and Lieutenant-Colonel Mar. 1, 1915, he retired July 19, 1922.

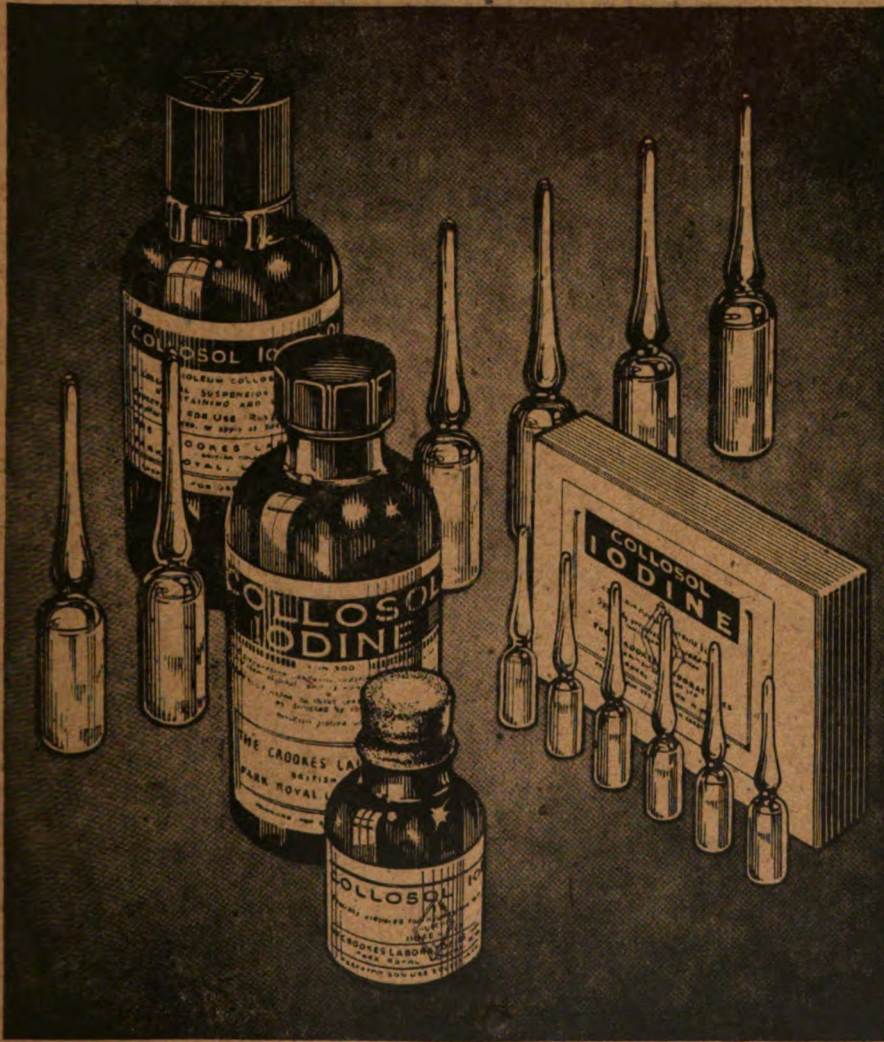
BRUCE.—On active service on Dec. 22, 1942, in North Africa, Col. William Bruce, O.B.E., R.A.M.C., M.B. Born July 12, 1887, he was educated in Edinburgh, where he graduated M.B. in 1911. He joined the New Zealand A.M.C. Apl. 8, 1915, and transferred to the R.A.M.C. Aug. 19, 1920. He was promoted Major May 18, 1927, and Lieutenant-Colonel Aug. 25, 1941. At the time of his death he was temporary Colonel. In the last war he served in Egypt and with the Egyptian Expeditionary Force in 1915 and 1916 and in France in 1916, being awarded the O.B.E., the British War and Victory Medals. He served in Waziristan in 1911-1921 and received the Medal with Clasp. In this war he served in France and North Africa.

BOND.—On Jan. 14, 1943, in Cheltenham, Col. James Henry Robinson Bond, C.B.E., D.S.O., late R.A.M.C., retired. Born in Heathfield, Somerset, July 21, 1871, he took the L.R.C.P. Lond., and the M.R.C.S. Eng., in 1898. Commis-

sioned Lieutenant R.A.M.C. July 27, 1899, he was promoted Captain July 27, 1902, Major July 27, 1911, Lieutenant-Colonel Mar. 1, 1915, and retired with the rank of Colonel Sept. 30, 1924. In the South African Campaign he took part in the Relief of Ladysmith including actions at Spion Kop, Vaal Kranz, operations on Tugela Heights (Feb. 14 to 27, 1900) and action at Pieters Hill; operations in Natal, 1900, including action at Laings Nek; operations in Transvaal and Orange River Colony. He received the Queen's Medal with six Clasps and the King's Medal with two Clasps. He served in France in 1914 and 1915 and in Mesopotamia from 1915 till 1919. Four times mentioned in despatches he was created C.B.E., and received the D.S.O., 1914 Star, British War and Victory Medals.

POYNDR.—We have received the following appreciation of the late Lt.-Col. G. F. Poynder from Dr. J. G. da Rocha, late of the Mildmay Mission to the Jews. An obituary notice was published in our last issue:—

"On Col. Poynder finally leaving the Army he felt a lively desire to continue the healing art and on Jan. 5, 1918, joined the staff of the Mission, where from the first he won the hearts, confidence and gratitude of the patients. A genial warm-hearted colleague, he believed in the very letter of the Holy Scripture and encouraged his patients to rely on God's blessing. In 1933, after fifteen and a half years with the Mission, he retired to the regret of all the staff and patients, whose hearts go out in deepest sympathy to all his family."



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Journal of the Royal Army Medical Corps.

Original Communications.

PERSONAL IMPRESSIONS OF THE MEDICAL SERVICES IN THE PRESENT WAR.

By MAJOR-GENERAL PHILIP H. MITCHINER, C.B.E., T.D., M.D.,
M.S., F.R.C.S., K.H.S.

I HAVE been able during my wanderings in the present war to see much of the work of the medical services, not only of the Army, but of the Navy, Air Force and Civil Organizations (E.M.S.). Generally speaking, I have been impressed greatly by the quiet efficiency of their organization and the understanding and co-operation which exists especially between the higher ranks of all Services. I may, however, be permitted to remark that co-operation is not always so complete, even in the same Service, between the regimental, area and station medical officers themselves and their civil colleagues, which I think is all too often due to lack of personal contact, failure to achieve which is due in many cases to shyness in visiting or an erroneous fear that such a procedure may not be a Service custom or even derogatory to personal dignity! Such co-operation is essential to the efficient running of medical services and can be possible only where personal knowledge of one's colleagues and their difficulties exists.

In many cases also, criticism, which is always helpful if of a constructive nature, is unhelpful because it is bitter and destructive and—alas—all too often given to laymen and patients. This is a matter where thoughtless criticism has done very much to undermine the good standing of the medical services throughout the whole country and is one to which too much attention cannot be paid by my many medical colleagues who must learn—often a very bitter lesson—that there are other medical men who by different methods can show themselves just as good doctors.

Specialism.—I have been very much struck in all walks of medical life by the great number of specialists, all too frequently self-styled, who are there to diagnose and treat diseases, and the great scarcity of doctors to treat patients! It must be remembered that the first task of the medical service is to keep men fit and not merely tinker up diseased bodies; to do this a doctor must exercise his knowledge of the world, of people and his commonsense as well as his professional skill. He must co-operate closely with the regimental officer in preventing boredom, ensuring mental and physical alertness as well as supervising diet, personal habits and hygiene of the many men in his unit whose personalities he must study carefully. It will be seen therefore that he must be first a doctor and has then scope for all and every speciality which exists. All these constitute his endless and all-absorbing duty, which is very much more than routine sick parade, inoculations and the completion of returns for statistical purposes.

Medical Services in Battle.—From what little I have seen of active service in the present war I am inclined to think that there is really no place for the medical services in the chaos of modern battle and that it would be well for military efficiency if the medical services were withdrawn from the battle area until a lull has occurred, when they could be sent forward to collect casualties and return them to those units where surgery can be performed as near the battle area as possible. To this end mobile surgical teams and dental units have been designed and should form a valuable adjunct to the re-organized medical services working in the field dressing stations or, in exceptional circumstances, even forward at the advanced dressing station of a field ambulance. In order to ensure their transport and the evacuation of casualties with reasonable security it will surely be necessary to provide armour for ambulances and vehicles of mobile teams, especially those which accompany armoured divisions. In this respect it has struck me very forcibly that in such units one or two light ambulance cars could be attached to the headquarters of each tank battalion and used to pick up casualties as lulls occur locally with the object of evacuating them back to Brigade headquarters and the field ambulance, in which region I venture to think the R.M.O.s of the various tank battalions could be concentrated with advantage during the battle.

First Aid.—As a corollary of the foregoing remarks it is obvious that every officer, man and auxiliary in the entire Army must have an elementary knowledge of first aid so as to be able to help himself and his immediate companions in the event of sustaining wounds in these grim and extensive battles, during which no immediate medical aid is feasible. For this reason it is essential that everyone throughout the Service should be taught elementary first aid. For this purpose five lecture-demonstrations—on Hæmorrhage, Shock, Burns, Blast Injuries and Fractures—should be given to all personnel. It is best that the medical officer should instruct officers and N.C.O.s and allow them to transmit the instruction to the other ranks of their unit. It is, however, essential that the medical officer should oversee the practice of the first

aid teaching which must be carried out regularly at monthly intervals in order that all men may understand the simple methods which must be taught. In regard to the teaching of first aid it is essential that such instruction should be simply-worded and entail only one method of treating each condition suitable to the conditions likely to prevail on active service so as to avoid muddling the first aid worker. Speed, not perfection, must be aimed at in applying dressings and the personnel taught to do their first aid in the dark by the light of an electric torch or the flickering glow of firelight and under cramped conditions such as exist in armoured fighting vehicles.

Remember that the tourniquet, in other than medical hands, is all too often used unnecessarily and causes the loss of more limbs than the saving of lives, though this is not the opinion in some R.A.F. circles where each member of a bomber crew carries a tourniquet.

One cannot help being struck with admiration by the ingenuity of the many methods employed to remove wounded from aircraft, tanks and naval vessels and I think that more demonstrations should be given to get these methods wider publicity.

Triage.—It is essential to have an experienced doctor, with quick decision and good surgical knowledge, to sort the casualties on arrival at aid posts and dressing stations. Thereby lives are saved. Many of the apparently trivial wounds have penetrated and need operation; the slightly shocked have an internal hæmorrhage; two or more injuries co-exist of which one may not be obvious; and the need for resuscitation may be great and urgent in an apparently placid casualty.

Shock.—What constitutes shock? Its clinical phenomena are seen almost as severely in the mentally upset and shaken as in those who have severe hæmorrhage or extensive burns. Yet in the latter types there is accompanying restlessness and air hunger which is absent in the former type where, however, the more mentally intellectual the patient the greater tendency to attempt concealment of the mental strain and the greater tendency to restlessness and mental irritability. Incidentally, this type of patient is very liable to become a chronic alcoholic, not of the honest type, but a “nipper” and a keeper of a bottle under the bed. It behoves the doctor, therefore, to keep an eye and a tight hand on all the good fellows of this type, where much can be done by understanding and a word in season. Is it just possible that all these conditions are due to tissue dehydration induced by mental overaction and free sweating and aggravated by loss of blood and other body fluids? If so, then we should face battle with a body full of fluid taken as drink and try to get more drink during and after it; a point well known to the Army and in First Aid work, as here the provision of hot drinks is one of the chief concerns of all forward and First Aid units.

Never forget resuscitation is a necessary preliminary to treatment. I cannot help feeling there is too great a tendency to resort to transfusion unnecessarily, with resultant waste of good blood, plasma or serum with not

more, and even less, benefit to the patient than would be derived from the simple and easier methods which can be administered anywhere by all First Aid workers. Certainly transfusions should not be given in the streets and in the average regimental aid posts—not to me at any rate.

Wounds.—Bomb wounds as I have seen them are of two main classes : (a) Small multiple superficial wounds, often associated with multiple punctures from broken glass, involving large areas of the body, and being far too widespread to allow for excision (without flaying the patient—a shock producing torture!) and best treated, I think, after adequate soap and water cleaning, *not* with a brush, by painting with 1 per cent aqueous gentian violet or 'powdering' with sulphonamide powder if around the eyes. *But* be sure that no one of the small and apparently superficial punctures has penetrated deeply—and no cursory examination will ensure this. I have seen meningitis, a perforated portal vein and internal hæmorrhage complicating such multiple "superficial" wounds dressed in a First Aid Post and ordered home! (b) Large lacerated wounds which may eviscerate, avulse limbs or remove the lower jaw and portions of the face. All such wounds are complicated more or less by the effects of *blast*, a puckish element of which, as of the Irishman, one may say "it is impossible to prognosticate his reaction and it is doubtful if he can do so himself." Broadly, the effect of blast is concussion which may cause multiple hæmorrhages in any or many viscera: and the great secret of successful treatment is to have the patient quiet and undisturbed. One cannot leave such a case in the open in the street or on the field of battle: but dope the patient well with morphia—move him back such a distance at one move that he can be retained undisturbed for at least fourteen days. Many short moves spell death and disaster in blast cases.

Bullet wounds present no special features other than are well known, nor do the many *closed and open fractures* which occur, the latter often as a complication of accidents and wounds.

In regard to delayed union which is so generally noted in fractures during the present war I feel convinced that this is due to over-manipulation and hyperextension in correcting the fracture and is to be attributed therefore to orthopædic interference. It is a noteworthy fact that in certain clinics which I have visited where over-traction is carefully not employed delay in union is not seen.

It is for consideration therefore whether too perfect an anatomical position, obtained at the loss of man hours, is economically sound.

Wound Treatment.—Wound treatment calls perhaps for some comment. Only if *excision* can be performed in the first few hours can primary union be hoped for and then it seldom occurs. Under conditions of modern war and aerial bombardment it is not often possible to get the patient to the operating theatre under twelve hours from receipt of the wound and it may be very much longer. Under these conditions infection is bound to occur and excision must give place to *débridement*, removal of obviously dead or

damaged tissues, and the provision of an adequate counter-opening for drainage at the most dependent part of the wound. In this respect remember "the most dependent part" must be applied to the position in which the patient will be nursed in bed and *not* as he lies on the operating table. Much good work is wasted and second operations rendered necessary by forgetfulness of this simple fact in the rush of casualty surgery.

As to whether or not sulphonamides should be powdered into the wound after surgical cleaning by excision or *débridement* (certainly *never* without), is, I think, a matter for judgment and should be determined largely by whether sepsis is likely to occur. So that as a general rule it is unnecessary if excision is early and thorough. Care must be taken not to use more than 10 grammes or toxic effects may occur. Personally, I am not convinced as to the benefits of local wound application over administration by mouth if it can be ensured that this can be started should sepsis manifest itself. But it is obvious that, in an unconscious patient or one being moved within a few hours of operation, an unwise proceeding if it can be anyway avoided, local application of sulphonamides in the wound has much to recommend it.

It is probably a wise rule not to suture any wound after excision, certainly never after *débridement*, and never if there is any suspicion of tension on either deep or superficial sutures. An exception occurs in facial wounds where skin should be sutured always to mucous membrane and the case conveyed to a maxillo-facial clinic with the minimum of delay.

Dressings.—Lacerated wounds and open fractures do best, and the patient is far more comfortable, if the part is encased and immobilized in plaster of paris after the method popularly associated with Trueta, but practised by some French (and even British!) surgeons with success in the late war. But if the patient is travelling in an ambulance or being moved from the surgeon's personal supervision within four days from the operation, the plaster must be bivalved, for if sepsis occurs œdema may and does often lead to loss of limb and even life. There is no means in an ambulance of bivalving a plaster and once a patient is committed to an ambulance, or indeed any transport under war conditions, only God knows when he will leave it. Incidentally, I wonder how many of my readers have ever ridden in an ambulance and realize what an uncomfortable and shock-producing journey it is, even under the best conditions. Never commit a really ill patient to an ambulance under war conditions unless circumstances render it unavoidable.

Burns.—At the outbreak of the present war it had, I think, become generally accepted that some form of tanning constituted the ideal treatment for burns. Since then we have seen a return to chaos and the advocacy of almost all forms of obsolete and long-forgotten treatments (except cowpats) and several new ones of various values. Why this complete *volte-face*? The reason, I think, lies in the fact that under war conditions the early and thorough cleaning of and around the burnt area, equally essential to ensure asepsis in healing as early and thorough wound toilet, is impossible or next

to impossible to attain, so that, as with most wounds, all burns must be expected to go septic and will do so.

If, then, a rigid tan is applied œdema under it from sepsis and inflammatory reaction, as under a plaster of paris around a limb, will probably cause pressure gangrene of tissues not to mention great pain. Hence the swing back to the use of older and, to my mind, less satisfactory methods of treatment with the added reason that the plastic specialists call for a soft scar on which to exercise their art. I have yet to see statistics of the number of burnt patients who perish before their soft scars come to the plastic surgeon. Be this as it may I am convinced that, as a first aid measure, immediate tanning, either by tannafax, gentian violet, brilliant green or triple dye (these latter not easily portable in the field except in "jelly" form) or even tea, is the only sure way of easing pain and saving life in many cases of severe burns under war conditions. Patients so treated are saved shock and arrive far fitter than those submitted to other first aid dressings. Of course cleaning must be carried out in hospital; but whatever method has been used sepsis is to be expected, hence the rationale of hyperchlorite in silken sacs so ably advocated by Bunyan. Personally, I should prefer using a method producing a non-rigid crust if I thought sepsis would occur to any great degree.

Sulphonamides are an excellent dressing for face and perineal burns and may be given with advantage by mouth as a prophylactic to sepsis in all severe burns from the commencement of treatment.

Shock always needs treatment and serum or plasma is better than whole blood while saline is to be avoided in burned patients, being very prone to cause lung œdema. Drip transfusion is of value after the first pint of fluid and can in severe cases be continued with advantage for a day or two as necessary. Should pain occur under any coagulum it is an indication for its instant removal, as it means pressure œdema, usually from incipient sepsis.

Painful Heels.—Painful heels cause much trouble, as do other foot troubles, in the field army, due partly I think to the fact that troops seldom walk; so the care of feet and foot gear tends to be neglected. Much can be done with care and attention to systematic cleanliness of feet and regular washing and proper darning of socks and the softening of boots.

MEDICAL CONDITIONS.

It may be considered impertinent that I, a surgeon, should comment on medical conditions but there are one or two facts about these which I think call for comment.

Respiratory diseases. in spite of overcrowding, unavoidable under certain conditions for short periods, have been uncommon and can be greatly lessened either by spraying before billets are occupied each evening or by suspending trays of bleach above the heads of the inhabitants and stirring it up once a day.

Skin diseases. apart from scabies which is a serious problem, do not call for comment.

Scabies has many cures with vocal and ardent advocates, but I feel convinced that thorough hot bathing, entailing a real scrub with soap and water together with a synchronous change into clean underclothes, is the true solution, combined with an effective carrying out of the provisions of the Scabies Order at the patient's home. From my observations I do not think disinfection of bedding necessary but where no pants or short pants are worn disinfection of trousers should be carried out. Don't forget the A.T.S. get scabies.

Digestive troubles are most marked in the first weeks of service and tend to disappear with acclimatization to diet and as the recruit becomes regular in bowel habits and accustomed to fitting them with Service routine. The Army Catering Corps is to be congratulated on its efforts to improve the feeding and cooking in the Army but there is still a tendency to serve too greasy dishes in many units.

V.D. has been surprisingly low in incidence and mild in type. I have been struck with the efficacy of sulphonamide treatment and the very small proportion of relapses following its use and also by the extremely toxic condition of the unfortunate patients whilst under treatment.

In regard to the treatment of syphilis, it is, I think, a pity that more use is not made of mepharside, which appears equally effective and far less toxic than the arsenical compounds commonly used in the Army.

CONCLUSION.

There are doubtless many other conditions, surgical, medical, pathological, psychical and even gynæcological; upon which I might have commented and which can be seen at the profitable clinical meetings of the many Service medical societies, some of which it has been my privilege and profit to attend; but these are in the ordinary interesting routine of our professional life and call for no especial comment under war conditions.

Moreover, I have not dwelt on the interest of visits to units where normal men and women delight one with hospitality and discourse and intrigue one with the diversity of their natures. Surely there is never one dull minute in the life of a Service medical officer!

Finally I must thank all my many colleagues in many places and Services who have so courteously received, entertained and tolerated me. Doubtless many of them will entirely disagree with my conclusions—I hope they will not hesitate to say so and record their own.

MEDICAL EXPERIENCES WITH THE RINGROSE FORCE IN ABYSSINIA.

BY MAJOR R. J. MCGILL.

Indian Medical Service.

AFTER the fall of Asmara in March, 1941, the Italians retreated south to the fastnesses of Abyssinia and two garrisons, Wolcheffit and Gondar, held out during the rainy season. The safety of Gondar depended mainly upon the strength of the natural fortress of Wolcheffit.

Wolcheffit is a mountain of about 12,000 feet, and zigzagging up the sheer precipitous northern face had been hewn the road to Gondar. This road the Italians destroyed in places and Ras Dascian (15,000 feet) and impenetrable mountains and gorges rendered the approach from the east impossible. Only the south and west were open but the Italians held the south with Gondar, the approaches to which were impassable except over Wolcheffit.

There remained the west. Wolcheffit there terminates in sheer cliffs hundreds of feet deep except for one narrow causeway not wider than 50 yards across and giving access to a peak from which a rough steep track leads to Bosa Village 6 miles away. The causeway is protected by two forts and a third overlooks Bosa Village.

This Western Sector was assigned to the Ringrose Patriot Force, commanded by Major B. J. Ringrose (now Lieutenant-Colonel B. J. Ringrose, D.S.O.) who had volunteered for service amongst the Abyssinians or Habash as they are more commonly called.

However, practicable as was the approach from Bosa Village for hardy mountain troops and pack mules, the route to the village itself from the British Base at Zerema is a narrow foot-track which is either a quagmire in the valleys or a heartbreak for man and beast on the ridges. It first circles away and over the mountains to the west and then south and east towards Bosa. It is a three day journey, and climbs and descends precipitous ridges and cliffs, up and across river beds and through hostile Shifta (or Bandit) Country, from an initial height of 3,000 feet at Zerema to Bosa at 10,000 feet. It is impossible adequately to describe the condition of this track during the rains. The mules would frequently sink knee-deep in the mud and at intervals on the cruel ascents the carcass of one dead from exhaustion would be encountered. As often as not the riding mules collapsed and the journey had to be completed on foot. I myself tramped the whole way there, preferring the stress and strain of climbing to the constant danger from jagged thorns and overhanging branches which in places literally overwhelmed the track. Parts of this pass led through Shifta country and sniping and bomb-throwing had to be expected. Even the villagers were treacherous. Our

convoys were frequently attacked and robbed and it can be imagined how difficult was the problem of evacuation of wounded and the transport of supplies.

The Force itself consisted of 11 British Personnel (the O.C., one Subaltern, Second Lieutenant A. Railton, one Medical Officer, two Serjeants, three Signallers, two R.A.M.C. Privates and my Indian Hospital Corps Orderly), twenty Commandos, the Third Ethiopian Battalion, 200 strong, trained in Khartoum and splendid fellows, 500 Abyssinian Loyalists and 15,000 to 20,000 so-called Patriots.

I carried my initial medical kit in cartridge cases, one strapped on each side of a mule. They were severely battered in the bush and by the cliff sides but nothing was lost or broken. Clamped down with the lids uppermost they proved water-tight, providential in view of the torrential rains which last for at least three hours daily in the rainy season. The rain drove through my tent on the first night out and I was not very dry but, and this will seem sacrilege to my Indian friends, some melted ghee, applied by my Orderly when we reached Bosa and had an opportunity to stop and dry our kit, kept out every storm and, incidentally, when the sun was strong and the ghee melted, every visitor also. I shall always now associate the smell of ghee with mountains, lice, fleas and floods.

Subsequently fifty cases of medical stores in panniers were sent to us, each pannier being so weighted as to constitute one mule load. Their safe arrival was a tribute to their selection and the skill in packing.

The chief point of medical interest on the track journey, and my most serious problem at the time, was my own bodily reaction to the rapid increase in altitude. The third and last lap of the journey is the severest, and I had to summon all my strength and will-power to accomplish it. However, after living at 10,000 feet for two weeks, I was tempted to conquer a neighbouring peak and found that I could then climb with ease. I was amazed at my rapid acclimatization. Later still I was never exhausted by the steepest hills—well, hardly ever. Towards the end of the campaign when the rains began to diminish it was proposed to send East African troops to us and I advised that the men should be given six days for the journey and that they should remain at Bosa for two weeks before they were sent into action. The Habash himself runs up the mountains, and simultaneously carries on an animated discussion with his companions. He is usually thin and wiry and until old age can carry heavy burdens up the steepest mountains with ease. Most cardiologists agree that one cannot strain a healthy heart. The case which follows illustrates this. As the campaign was drawing to a close and the Italians became short of provisions, they led a covering sortie one day against our forward position, while a party endeavoured to collect grain in the fields between our lines and theirs. Reinforcements were urgently required by Railton, whose men were repelling the attack and, to the sound of war horns and fusillades of shots, Bosa Camp sent help. The shortest route was taken,

practically uphill all the way for 6 miles at the maximum speed possible. One man carrying a machine gun, bayonet, heavy bandolier and revolver, reached the last and steepest part of the track and then collapsed. His features were drawn, his face was as pale as an Abyssinian's can be, his clothes were saturated with sweat and his pulse was extremely rapid and of poor volume. However, the apex beat was normal in position and the heart sounds were loud and regular. He rapidly revived during ten minutes' rest and insisted upon completing the journey.

Our Main Force camped near Bosa Village, and after changing hands several times, the Forts guarding the Causeway, "Battalion" and "Mortar," were held by us. For three months in these forts and forward of them the majority of our casualties occurred and it was always a most trying ordeal transporting the wounded over the 6 miles of mountains back to Bosa Camp. There was an attack by either side about every ten days. I had six stretcher teams organized, the bearers being really muleteers who took the day off on battle days to see the fun. Each team consisted of six to eight men commanded by one of their number and given the rank of "Capitano" by me. This gave him added prestige and some justification for once again asking for increased pay. The stretchers were made from boughs cut from the bush and criss-crossed with shorter pieces. They were padded with leaves, and the patient was tied on with strips of hide.

The casualties nearly always demanded to be kept at Bosa Camp. This was in a way just as well since to evacuate one man further over that frightful track required 20 bearers and £20. Five days would be spent on the journey down, three days for rest at Zerema and three days on the return. The evacuation of a dozen casualties to Zerema would, therefore, entail the absence of 240 good men for nearly a fortnight, many more than the Force could spare. In my initial inexperience I insisted upon our first compound fracture, a G.S.W. of the femur, being evacuated next day, but on the following morning the patient, his friends, and our Thomas Splint had fled the camp and were well on the way to their village. The friends had by this time seen something of the methods of maintaining tension on the limb, and I can but hope that, if the patient has survived, not too sorry a union has resulted.

Our theatre was a thatched hut built by the muleteers. It was about 9 by 12 feet by 8 feet high at the ridge pole. The roof leaked wickedly and the bitterly cold winds shrieked through the interstices in the walls no matter how thick and closely thatched we had them made. We tried hanging our limited number of ground sheets beneath the roof and against the walls but on battle days these invariably had to be removed to provide cover and protection for the stretcher cases awaiting treatment. One's hands became stiff with cold and the only remedy was frequent washing in water maintained hot by the cook and his myrmidons. At the conclusion of 33 cases on one bleak battle day my hands were chapped and raw. We had deep channels cut at the foot of the walls to carry away the surface rainfall. In our ignorance

at the beginning these were not deep enough, and one afternoon I operated straddling a stream as it flowed across the floor. Frequently casualties would arrive in the late evening and lighting was a difficult problem. The Signallers lent me their battery and wired up a small globe but the result was always a Stygian gloom, not conducive to success in the search for a piece of projectile or a bullet. Our table was a stretcher, resting at each end on a double box of dollars, the monthly pay for the Force. It was really not so inconvenient since there were masses of assistants who would tip the table as we desired. The only difficulty was that the juxtaposition of attendant Habash and Ethiopian Dollars bred evil thoughts in the minds of the former and a close watch had to be kept on the patient's condition and his friends.

The cook was always my willing ally and boiled the instruments as only a cook can.

No other anæsthetic being available, we used pure chloroform throughout and not once did it cause the slightest anxiety. The Senior R.A.M.C. Private soon became a proficient anæsthetist and I could then leave him with all confidence while I attended to the wound. We used tr. iod. mit. for the skin preparations and acriflavine for the wounds. Healing was nearly always rapid and unattended by gross sepsis except in the more elderly men. I think that the height and consequent hyperconcentration of hæmoglobin were factors in the rapid healing. In my own case I cut an index finger so deeply that the subcutaneous fat protruded through the wound but six days later the skin had completely healed, a much rapider process than at lower altitudes. Isolated as we were, I missed a microscope, as witness my diagnosis of relapsing fever in what eventually proved to be kala-azar.

Apart from the battle casualties, several interesting conditions were encountered. Leprosy was seen in a local village priest, an old man who stood on stumps, his feet having long since eroded away. Conjunctivitis was common and due to the absence of chimneys in the native huts. Every Abyssinian suffers from tapeworms and periodically even the chiefs must retire for a day or two for intestinal disinfestation. The native remedy is Kusso, the berry of an indigenous plant and a substitute for Felix Mas, which I should like to bring before the notice of the profession. This universal affliction is due to the Habash custom of eating meat raw or only partly cooked. Meat is cut into strips and hung in festoons from the ridge pole and on entering a native hut it is difficult to avoid an unpleasant encounter of one's face against the family larder. Despite the intense cold and, judging by our standards, inadequate clothing by day and night, no case of bronchitis or pneumonia occurred. Chronic iritis and its crippling effects were not uncommon but I had no means of judging if these were due to syphilis. The Habash is completely devoid of the most elementary principles of sanitation and yet only two cases of dysentery, presumably bacillary, occurred.

Syphilis was our biggest medical problem. Every day at least half a dozen new cases came for treatment. Syphilis abounds in Abyssinia and is of a most

serious and acute type. The Italians aver that syphilis has always been endemic and because of it the Abyssinians are a degenerate race. On the other hand the Abyssinians accuse the Italians of introducing it into the country and spreading in a previously unaffected race it has reaped a devastating harvest. I feel inclined to absolve the Italians from blame, after seeing congenital syphilis in a village youth with bilateral corneal opacities and huge crippling but healed ulcers on both lower legs. Otherwise, all the lesions encountered were either primary or secondary. I saw no tertiary or neuro-syphilis. No arsenic, bismuth or mercury was at first available and the only criterion for sending a man back to Bosa was whether or not the disease temporarily incapacitated him. It is a traditional Abyssinian custom for a youth at the age of 18 to have sexual intercourse and the extremely widespread incidence of syphilis is partly due to this. All patients were promised injections at the end of the campaign. Had we evacuated all cases, we should have had very little Force left. The primary chancres were usually large and associated with much œdema. The commonest secondary lesions were condylomata and during the battles it was not pleasant without gloves to have to apply a Thomas Splint in a grossly condylomatous patient.

Many villagers came for gratuitous treatment but, after we had been attacked by them in the middle of the night and since we were then short of rations, I fixed a fee of six eggs for their consultations. Thereupon the numbers attending subsided rapidly.

Battle casualties presented every type of wound from bullet, H.E., and land mine. Through-and-through bullet wounds of bone were fairly common and, with simple immobilization in improvised splints, all did remarkably well. Two shocking face wounds inflicted by land mines were treated by cleaning out the clot and then stitching the apposed edges. What at first sight appeared to be hopeless and suitable only for packing proved in both cases to respond to this treatment and good æsthetic results were achieved. Our biggest effort was a laparotomy and repair of multiple bowel lacerations, the small and large bowel both being completely divided as the result of a bullet wound in the right hypochondrium. I had repaired the small bowel and had just completed the colostomy when the patient died on the table. Since the liver was lacerated and severely pulped it was a hopeless case and although deep mattress sutures controlled the bleeding, he was too low by that time to rally. There were five cases of through-and-through bullet wounds of the chest. These were closed by stitching. In the two most serious, where an open pneumothorax was a complication, the sutures were pulled tight while the breath was momentarily held at the end of expiration, and firm pressure was maintained by pads and tight bandages. All recovered without incident except for an alarming hæmoptysis in one otherwise uncomplicated case. In the two pneumothoraces no signs of fluid appeared and the lung gradually re-expanded.

The casualties were housed in their own huts and despite the primitive

conditions most progressed remarkably well. Apart from wounds fatal on the Field and an occasional murder we had three deaths, one from shock, in a bullet wound through the upper third of both femora, one in the abdominal wound described above and one in an obscure case of jaundice who refused to be evacuated. With the means at my disposal I could not elucidate the diagnosis further.

We were all infested with lice and fleas and the only result that captured Italian antiflea powder produced was a dermatitis much more irritating than the fleas themselves. The third pest was the *Stomoxys*, a fly of peculiar viciousness, whose bite is followed by a flow of blood and profanity.

In the slack intervals between attacks I spent much of my time exploring the surrounding country. When the Signallers wished to lay a wire by the shortest route between two points, my knowledge of the terrain was called upon and I led the wire party up and down cliffs, along ledges and through forests. I fear that as one of the Protected Personnel I contravened the Terms of the Geneva Convention.

Finally the Italians capitulated and the Force returned to Base through the enemy lines and down Wolcheffit cliffs. It was a most hazardous route and the evacuation of our wounded was only partial until the road could be reopened. To illustrate the terrifying heights which abound in this district, I must conclude with the story of the Driver who later ran off the road and fell with his truck many hundreds of feet. Miraculously he escaped with only concussion and minor injuries and returned after six weeks to the scene of his accident. On being shown the precipice down which he had fallen, he fainted in the arms of his friends.

ET FORSAN HAEC OLIM MEMINISSE IUVABIT.

I wish to thank the Director of Medical Services, M.E.F., for his permission to publish this paper and Lieutenant-Colonel P. A. Dargan, I.M.S., for reading and criticizing the draft.

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NOTES ON FOUR CASES OF BLACKWATER FEVER OCCURRING IN SOUTHERN NIGERIA.

BY LIEUTENANT-COLONEL E. P. N. CREAGH, M.B., M.R.C.P.,

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BLACKWATER fever is seldom encountered by Officers in the Royal Army Medical Corps. The writer has had the fortune to have had recently under his care four cases of this formidable disease. It is thought that short case notes and a summary of some interesting features observed may justify publication. Three of the four patients were officers who had been in Africa in a civilian capacity for some years before entering military service in this war. Two had suffered from blackwater fever previously. In none was there a really bad malarial history.

The clinical manifestations of the disease were quite different in each case, in fact hæmoglobinuria was almost the only factor common to all.

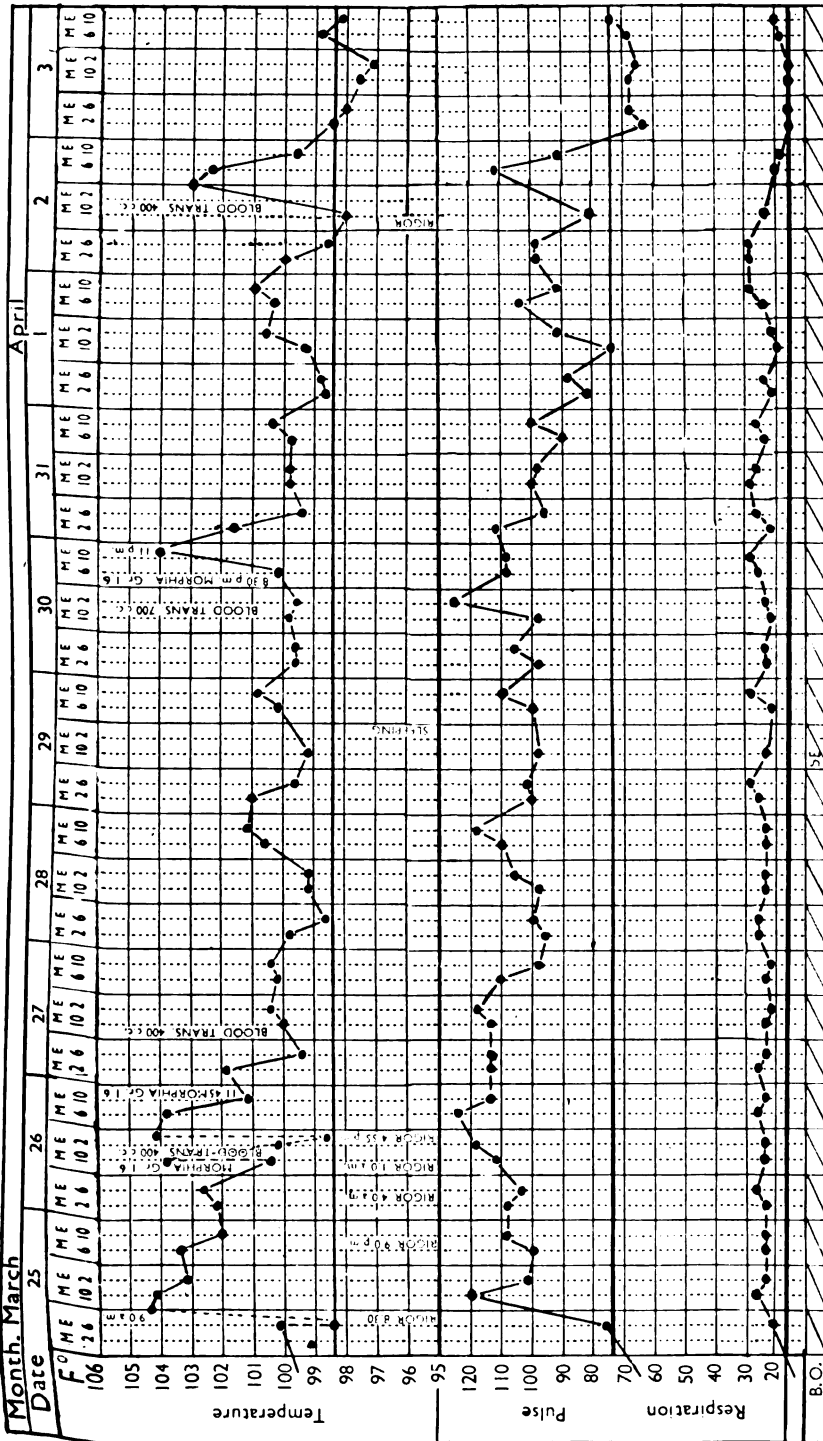
Case 1.—Lieutenant W., aged 41, had lived in East Africa for seventeen years. His last attack of malaria was in December, 1940, in West Africa. Had blackwater fever in 1936. He had been noted to be pale and ill-looking for some time previous to admission. He stated that he had felt very unwell for some days but had undoubtedly been unwise in his alcoholic consumption, particularly of late. It was felt that the history that he had passed "black" urine for the first time two hours before admission was not to be relied on. He was admitted on the evening of November 29, 1941, and died of uræmia on December 5, 1941.

Case Notes.—29.11.41—19.00 hours. Condition on admission. Pale, slightly delirious, temperature 104.2. Pulse 120, liver slightly + and tender, spleen not enlarged. No prostration, and after settling down in hospital became quite sensible. Passed small quantity of urine which was dark red to black in colour. Blood films—no malarial parasites seen. Treatment absolute rest in bed—quinacrine tab. 1 four hourly. Copious fluids by mouth, fruit juice, glucose and weak tea. Alk. powder, 5i emulsified in water, to be taken hourly until urine becomes alkaline.

30.11.41: Seen at 02.30 hours—general condition much improved. Temperature 100° F. Sweating but no improvement in urine of which he had passed a few ounces since admission. It was now almost black.

Pints vi fluids had been taken by mouth up to this time.

Later—10.00 hours. General condition fairly good but marked pallor, alert mentally and very co-operative. B.P. 128/90. Urine passed since admission ounces ix, uniformly black and in spite of intensive administration of alkali it was still slightly acid. Blood examination—total R.B.C. 3.75 mil., Hb. 80. Slightly jaundiced—pale yellow hæmolytic type. Typed for blood transfusion and crossed typed with two donors with whom he was found to be compatible. Treatment—enema to be followed by rectal alkaline saline. Quinacrine was discontinued in evening as it was not considered safe on account of oliguria. Glucose fluids by mouth *ad lib.* Alk. powder to be



continued until urine alkaline. Urinary output entirely inadequate, always black.

13.00 hours: Condition satisfactory except for oliguria.

1.12.41: Urine ounces 1 during night despite free intake. Pallor and jaundice more marked—no dyspnoea, pulmonary bases clear—no oedema. Has vomited twice—bile stained—no other evidence of uræmia. B.P. 125/85. Hot turpentine stupes to the loins. Blood-count, no change from yesterday.

15.00 hours: Pints i, 2 per cent soda bicarb. in normal saline intravenously.

21.00 hours: Pints iss repeated intravenously. In addition intake by mouth pints v during day. Urinary output ounces ii only. Purgative given.

2.12.41. 10.00 hours. Urine ounces vi has redder tint pointing to fresh hæmolysis. No oedema—lungs clear. B.P. 105/60. Liver further enlarged. Vomiting frequently. Total R.B.C. 2.3 mil., Hb. 40 per cent. Blood urea 113 mg. per 100 c.c. No other uræmic manifestations.

15.00 hours: General deterioration. 450 c.c. citrated blood given by drip in 75 minutes. Felt better for this.

21.00 hours: I.S.Q. Day urine ounce $\frac{1}{2}$. Condition appears hopeless. Urine contained heavy deposit of pus cells.

3.12.41: Night urine ounce i and showing evidence of fresh hæmolysis substantiated by blood-count. T.R.B.C. 2 mil., Hb. 38. Blood urea 210 mg. per 100 c.c. A drip infusion—soda bicarb. 3 per cent, glucose 5 per cent in normal saline—continued for four hours during which pints iii were given; no urine; patient now definitely uræmic, vomiting and twitching but showing no oedema. Prognosis almost hopeless.

4.12.41: Ounce 1 urine during last eighteen hours. Uræmic manifestations + +, consciousness dulled. Further active treatment not indicated. Passed ounces iii of urine which raised fresh hopes, coloured pink though clearer—placed on continuous oxygen during night. If urinary output improves a further transfusion will be given in morning.

5.12.41. 06.00 hours: Complete suppression of urine, unconscious, shallow Cheyne Stokes respiration. Morphia gr. $\frac{1}{4}$ i.v. as patient very restless.

12.17 hours. Died peacefully.

No necropsy performed.

Commentary.—This was the second attack of blackwater fever in a man who had spent eighteen years in Africa and who had been in very poor health previous to his illness. Hæmolysis was massive and recurrent. Intensive alkaline treatment by mouth and i.v. failed to prevent oliguria and later complete anuria or effectively to alkalinize the urine. Intake of fluids by mouth in the seven days of illness was pints xxxviii, intravenously pints vss and by blood transfusion pint i. Total urinary output over whole period was ounces xxii. He lost approximately pints iii by vomit and a fair quantity, not more than pints v, by bowel. Diaphoresis was seldom more than just obvious and yet (unless terminally) there was no oedema. The pulmonary bases remained dry and there was no ascites. It must be presumed that the renal tubules were effectively blocked by acid hæmatin crystals almost before admission. The clinical picture was one of progressive uræmia and anaemia and did not in any way react to treatment. I feel that the discon-

tinuation of quinacrine after first eighteen hours was inevitable owing to failure of excretion. He was a very excellent patient throughout and did all he could to keep cheerful and co-operate in his treatment.

Case 2.—Lieutenant G., aged 28.

Case Notes.—Had been employed by a trading firm in Nigeria from 1936 to 1940, when he was commissioned in the Royal West African Frontier Force. He did not suffer from malaria until October, 1940. There was a mild relapse in January, 1941. Except for this he had been in good health for the last five years. He states that he took his daily quinine regularly. He had not felt well for ten days before admission to hospital and had been under the care of his Regimental Medical Officer. Had suffered from lethargy and headaches. Three blood films were negative for malaria before admission.

Condition on Admission.—Afebrile. Complained of headache—examination N.A.D.

23.3.42: Blood film—negative malaria—urine normal—spleen not palpable.

24.3.42: Febrile during the day—very severe headache not relieved by veganin. Treated quinine grs. x t.d.s. Three blood films negative malarial parasites. Had fair night, vomited early morning and at 08.00 hours informed Sister that he had passed “black urine.” Severe rigor, vomited. Temp. 104°. Conjunctivæ icteric. Passed ounces v urine, dark and opaque with heavy deposit suggesting severe massive hæmolysis. Reaction neutral. Blood-typed—T.R.B.C. 3·8 mil. (Hæmogram p. 68. No further mention of hæmatological examination will be made.)

Treatment.—Absolute rest—copious fluids—water, fruit juice, dextrose, alkaline mixture g. ii (sodii bicarb. 2 parts, pot. cit. 2 parts, cal. carb. 1 part) two-hourly until urine alkaline and then regulated to maintain this. He had quinacrine g. 0·2 t.d.s. on this day. No further anti-malarial drugs were administered after this day.

26.3.42: Condition very grave—repeated rigors and vomiting. Skin and conjunctivæ rapidly showed severe hæmolytic jaundice—deepening from hour to hour. Passed ounces xcii urine in first twenty-four hours, every specimen showing results of gross hæmolysis—black to dark red—heavy amorphous deposit but remaining neutral or just alkaline. Intake pints x. B.P. 102/65. Morphia grs. $\frac{1}{8}$ given at 10.00 hours with a markedly beneficial effect—rigors and vomiting ceased and patient got a badly needed rest. At 12.30 hours 400 c.c. homologous blood given by drip over three hours. Rigor at 16.00 hours. Vomiting again was incessant from 22.00 hours till midnight when morphia grs. $\frac{1}{8}$ was repeated with good result. The vomit was usually deeply bile-stained. Later specimens of urine showed some improvement.

27.3.42: Very weak and anæmic—deeply jaundiced. B.P. 115/55. Fluid intake pints xiv, urine ounces lxvi definitely clearing but still showing hæmoglobin in progressively less amounts. Transfused 400 c.c. homologous blood drip three hours from 12.00 hours.

From this on there was a steady improvement, urine clearing, no further rigors, vomiting occasional, jaundice rapidly clearing, pulse improved, loud hæmic murmurs heard at cardiac apex and over P.A. Passed ounces lxx urine, now almost clear. Further donors standing by.

28.3.42: Progress maintained—urine tinge of methæmoglobin. Feeling better and stronger, no evidence of air hunger or restlessness, pallor extreme, jaundice almost cleared. Feeds increased—jellies, Benger's, etc.



6.4.42: Excellent progress. Campolon 2 c.c. Remarkable clinical evidence of active hæmopoiesis. B.P. 104/55. Heart apex-sounds closed, no hæmic murmur. Faint systolic murmur over P.A. persists. Urine ounces lx clear, faint trace albumin.

7 & 8.4.42: General improvement persists. Developing troublesome superficial sepsis. Carbuncle on left buttock and right thigh and left index finger and on head. Ferri et ammon cit. gr. xxx t.d.s. Diet, restricted protein intake.

9.4.42: Progress very good except for carbuncles. Blood urea 104 mg. Urine urea 1.4 per cent. Urine still contains trace albumin. Reticulocyte count 10 per cent.

11.4.42: Satisfactory; superficial sepsis well localized and doing well.

12.4.42 to 14.4.42: Remittent pyrexia with some constitutional disturbance which could not, in ordinary circumstances, be attributable to the localized superficial sepsis. Chart shows coincidental deterioration in blood picture but blood urea dropping to 66 mg.

15.4.42 to 20.4.42: Occasional slight rises to 99° but general condition excellent. Campolon 2 c.c. I.M. Blood picture shows gradual improvement but R.B.C.s still under 2 mil. Blood urea on 20.4.42 was 87 mg.

21.4.42: All septic foci have now healed. Careful general examination, N.A.D., except spleen though not palpable is enlarged (percussion). Feels well. Good appetite, evening temp. 100°.

25.4.42: Afebrile last twenty-four hours. Progress very satisfactory.

27.4.42: Blood urea 49 mg. per 100 c.c. Pyrexia, vomiting. Malarial parasites seen in blood film. Reacted quickly to quinacrine g. 0.1 t.d.s.

12.5.42: Convalescence smooth. Blood urea:—30 mg. per 100 c.c.

The interesting features of this case were:—

(i) Nitrogen retention combined with free diuresis and without evidence of nephritis or renal insufficiency. Uræmic manifestations were first seen three days after hæmoglobin had ceased to be present in the urine and after a very adequate urinary output had been maintained *ab. initio*. Moreover, the blood urea did not return to anything like a normal figure until a month later. I cannot attempt to explain this except on the grounds that it was probably due to inadequate tubular function while glomerular function remained unimpaired.

(ii) The continued deterioration of the blood picture for six days after the urine and/or skin ceased to manifest any further evidence of hæmolysis, and this despite blood transfusion. There seem to be two more obvious possible explanations of this (1) Hæmodilution during early recovery stage; no blood volume estimations were carried out but clinically there was no evidence to suggest this. (2) That further slight hæmolysis was taking place insufficient for hæmoglobin to pass the renal threshold or produce any obvious hæmolytic jaundice; this of course is possible but not convincing.

(iii). Value of repeated small slow blood transfusions. In this case it was felt that this was a life-saving procedure. There was undoubtedly a reaction on three occasions (rigor, pyrexia and diaphoresis) following transfusion in spite of the most careful matching of homologous blood but it did not reproduce hæmoglobinuria. Nevertheless, the writer feels that transfusions are

not to be undertaken without carefully weighing up the pros and cons, always remembering that one is quite ignorant of the pathogenesis of the disease and what pulls the hæmolysis trigger. The minimum time to administer an Army transfusion set bottle was never less than three hours. One aimed at 40 to 50 drops per minute.

(iv) Parenteral liver extract was given on the assumption that liver function was grossly upset and that it was possible that the intrinsic hæmopoietic factor might not be mobilized as it would in an ordinary case of anæmia due to hæmorrhage. The reticulocyte response was very striking—post or propter.

(v) Some factor other than the development of carbuncles retarded the recovery in this case and, though malarial parasites were not found until the thirty-third day, it is believed that malarial infection was probably the cause of this.

(vi) A very high colour index (1·6 to 1·2) was a persistent feature right into convalescence.

Case 3.—Captain T., aged 37.

Case Notes.—Had been employed by a trading firm in S. Provinces, Nigeria, since 1928. He suffered from blackwater fever on arrival in England on leave in 1932. Since then he has suffered from malaria of sufficient severity to need treatment in hospital once during each tour. He had felt unwell for about a week before admission. There had been low fever and diarrhœa during this period.

25.3.42: Temp. normal, later 101·2°. General examination; N.A.D. except slight icteric tinge in conjunctivæ. Urine contained bile pigment and bile salts and a trace of albumin. No malarial parasites seen in blood film. Some diarrhœa, fæces semi-liquid, not dysenteric. Treated as case of infective hepatitis and, in view of history, quinacrine g. 0·1 t.d.s. and quinine grs. x b.d.

26.3.42: I.S.Q. slight icterus. Evening temp. 101·2°, omit quinine.

27.3.42: Improved; urine only faintest tinge of bile pigment.

28.3.42.: Felt much better in morning. Temp. normal. At 15.00 hours felt very unwell after a sleep and passed urine containing much hæmoglobin and debris; it was opaque and dark red. Temp. 104·2°. Vomited once. Later there was profuse diaphoresis; soaked through mattress and dripped on to the floor. Treatment: Fluids; orange juice and dextrose *ad lib.*, alkaline mixture two hourly, comp. alk. salts. Urine quickly became alkaline and diuresis was free from the onset of hæmolysis.

29.3.42: All specimens of urine, total ounces lxxxii, contained considerable amounts of hæmoglobin and amorphous brown deposit; it has remained neutral—alkaline. T.R.B.C. 2·65 mil. Blood Group A(ii) donors cross typed. B.P. 100/55. Abdomen distended by flatus. Neither spleen nor liver edge palpable. Febrile. General condition good in circumstances, no further vomiting, diuresis and diaphoresis continues. By 12.30 hours urine showing signs of clearing. No anæmic distress.

30.3.42: Improvement maintained; urine clear. Pulse and temp. normal. R.B.C. 2·05 mil. Hb. 45 per cent.

31.3.42: Progress satisfactory. Was restless last night and had morphia gr. $\frac{1}{6}$ with benefit. Afebrile. Blood-count, rather surprisingly, shows further deterioration but decided transfusion not indicated.

1.4.42: Had good night. Fluid intake ounces xcvi and urine ounces lxiv, quite clear, no albumin. Blood urea 40 mg. per 100 c.c. Blood shows further deterioration.

2.4.42: Satisfactory, appetite returning, diet increased, egg, fish, chicken, blood somewhat improved.

3.4.42: Progress maintained. Anahæmin i c.c. i.m.

4.4.42: Progress maintained. Anahæmin ii c.c. i.m.

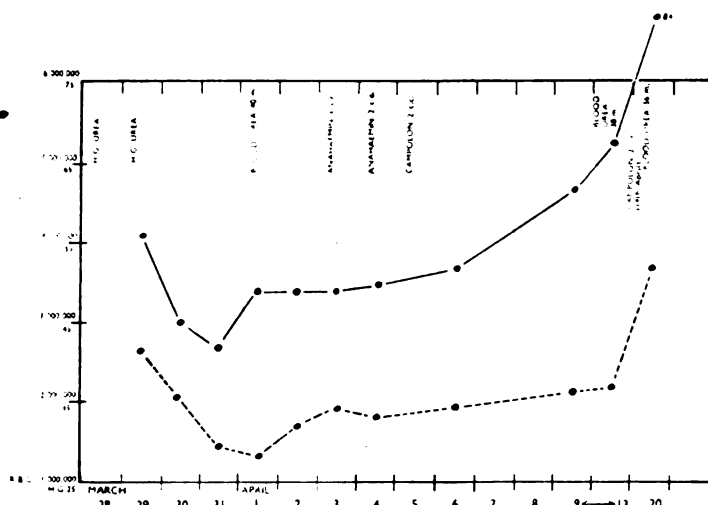
5.4.42: Progress maintained. Campolon ii c.c. i.m.

6.4.42: Satisfactory in all respects. B.P. 104/50. Diet increased; lightly cooked steak. Ferri et ammon cit. grs. xc p.d.

12.4.42: Convalescence entirely satisfactory. Now allowed 4 pillows and is doing a little more for himself daily.

14.4.42: Progress very satisfactory; campolon ii c.c.

25.4.42: Progress excellent; up for long periods.



CASE 3.—Hæmogram.

25.4.42 to 26.4.42: Relapse malaria. M.T. parasites in blood film. Treated, quinacrine gr. 0.1 t.d.s. for seven days.

27.4.42: Afebrile. Satisfactory.

Commentary.—This was a case of one massive hæmolytic (hæmoglobinuria lasting twenty-four hours) at the onset following a definite period of ill-health. There was no evidence of nitrogen retention and the convalescence was smooth except for a malarial (?) relapse on the twenty-seventh day when there was a rise in the temperature and malarial parasites seen. The presence of bile salts in the urine accompanying a very slight icterus in the conjunctivæ during the pre-blackwater period in hospital is suggestive that a mild infective hepatitis may have been a factor in precipitating the hæmolytic. A surprising feature in these three cases was that the spleen was never palpable during or after the hæmolytic.

Case 4.—C.S.M. S., aged 25.

This W.O. had spent thirteen months on the West Coast, principally in Gambia. He had only suffered from fever once and was treated in Quarters and no blood slides were examined. He stated that he had taken 5 grs. quinine daily. He felt ill for five days during a sea and train journey before he first noticed "black urine." Hæmoglobinuria had been present for twenty-four hours before admission off the train. His general condition was good. R.B.C. 3.0 mil. No malarial parasites were seen but the spleen was just palpable. He continued to pass port-coloured urine which was translucent and had none of the deposit seen in the other cases. The urine cleared in twenty-four hours but there were two short relapses before it remained clear. Lowest R.B.C. count was 1.7 mil. and the blood urea was 170 mg. per 100 c.c. on the second day. Blood urea on eighth day, 26 mg. He was afebrile and throughout, though he felt weak, showed no toxic manifestations.

His convalescence was rapid and entirely satisfactory until he left the station *en route* for England.

This case presented quite a different clinical picture to any of the previous three cases and represents what might almost be described as a benign form of the disease.

It will be noted that both Cases 2 and 3 were already in hospital before blackwater fever developed and that diuresis of alkaline urine was easily obtained. It is felt that these were factors of primary importance in prognosis.

The injection of morphia in gr. $\frac{1}{6}$ doses undoubtedly exerted a favourable influence in Case 2 and it is felt that this drug, judiciously employed, is indicated in cases with adequate excretion but showing marked restlessness, apprehension and vomiting.

The experience gained by the care of four cases does not justify any dogmatism in the treatment of this disease so protean in its manifestations. This is particularly so regarding the wisdom of administering anti-malarial drugs. It is almost generally accepted that quinine is contraindicated. Malarial parasites are seldom seen and were never, until long afterwards, seen in these four cases. The writer feels that in the rare event of malarial parasites being found an atabrin substitute should be given but doubts whether routine administration is justified and certainly not in cases where oliguria is present.

In conclusion, I must thank Colonel H. A. Rowell, M.C., late R.A.M.C., Officer Commanding — West African General Hospital, for permission to publish these cases, Lieutenant-Colonel M. F. Nicholls, R.A.M.C., for assistance with transfusions, Major B. Blewitt, R.A.M.C. for many laboratory investigations, Private J. H. Hack, R.A.M.C. for the preparation of Charts and, last but by no means least, the Nursing Staff of — General Hospital and, in particular, Sister Miss S. M. Holmes, T.A.N.S., for their expert care of these cases.

FURTHER INVESTIGATION OF NIGHT VISION AMONG PERSONNEL OF AN A.A. UNIT.¹

BY CAPTAIN BRIAN ST.J. STEADMAN,

Royal Army Medical Corps.

FOLLOWING the conclusions reached in an investigation of night vision among personnel of an A.A. unit, the report on which was published in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS for January, 1942, endeavours were made to discover or devise a simple, practical and inexpensive test for night vision, suitable for use in the field and which could be operated by a responsible N.C.O. without prolonged special training.

OUTDOOR TEST.

The first test tried out consisted of large black letters 15 inches square and 3 inches thick on a square white background. The letters used were those which could be placed in four different positions such as C, E, and K. The test was carried out at night in the open. Orderlies held the letters in front of the men being tested and moved 5 feet backwards for each test. Three letters were shown in each position. Those that could recognize the letters at the greatest distance had a better night visual standard than those that failed earlier. The eyes of those tested were fully dark adapted previously. The drawbacks to this test are that it is not a standard test as the conditions vary considerably with the weather and the phases of the moon and the test cannot be carried out satisfactorily in extremes of weather, i.e. fog and rain or bright moonlight. In summer too the time during which this test can be performed is limited and inconvenient.

STANDARD CANDLE TEST.

It was therefore decided that an indoor test must be used. The first problem was to obtain a standard light source of low intensity. Having read of Bishop Harman's apparatus for testing night vision using a standard candle an attempt was made to obtain the apparatus but the manufacturers at that time were unable to supply it. A lantern was therefore constructed out of a four gallon petrol can and a pint soup tin. A night light was placed in the lantern using an inverted soup tin as a candlestick. The light was projected on to a screen of reversed balloon fabric, painted matt black, 6 feet square. In the centre of this hung a white card 4 inches square on which was a black

¹ An Army Night Vision Test, approved by the Night Vision Committee of the Medical Research Council, has now been standardized and is in use throughout the Army. It is entirely different from the test described in this article.—*Ed.*

letter (Snellen's Type 36 metres). This card could be replaced by others, or hung sideways or upside down. The lantern placed 5 metres from the card gave a reasonable illumination and the subject, starting level with the lantern, could move backwards or forwards depending on whether he recognized the letter in the first position or not. It was essential for the room housing the test to be completely dark. In Bishop Harman's test small white discs on a black background have to be counted but it was felt that perception of rays of white light may not necessarily be the same faculty as the ability to recognize a dark object against a lighter background, as in spotting aircraft at night, and a black letter on a white background was therefore used. The difference in contrast between the black letter and the white card varies with the distance of the person being tested from the card (intensity of light varies inversely as the square of the distance). It then became necessary to obtain a standard candle to replace the night light used in the development of this test but though several large manufacturing houses were approached no standard candles were obtainable. The National Physical Laboratories were consulted but were unable to help and strongly advised against the use of standard candles in such a test as these were not considered to be reliable.

The flame of the standard candle may not always be in the same position owing to combustion of the candle or to draughts, and its luminosity is therefore liable to vary.

ELECTRIC STANDARD TEST.

An electric light bulb was then calibrated to one candlepower with the object of using this as the standard light instead of a candle in the apparatus described above. If the apparatus remained stationary this would probably have been satisfactory but difficulties, owing to variations of current (A.C., D.C.) and voltage and the varieties of batteries available, limited its sphere of usefulness. It was considered important to be able to take the apparatus to the men rather than to have to bring the men to the apparatus, particularly in small, scattered detachments of A.A. troops in the line. To purchase a battery, variable resistance, ammeter, etc., in order to facilitate mobility, was considered to be too costly and elaborate so that this test was also discarded.

DR. WRIGHT'S TEST.

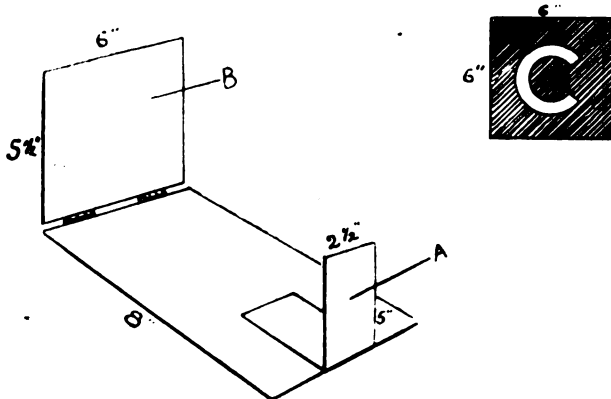
It was finally decided to make use of the test for night vision designed by Dr. W. D. Wright, A.R.C.S., D.Sc. and published by Messrs. Sir Isaac Pitman and Sons, Ltd. Dr. Wright's description of the apparatus is as follows—

“ The device consists of a wooden container which can be opened out as in the figure. In A a small disc of radium luminous compound provides a faint source of light which shines through a cellophane window on to B. Against B any one of nine cards can be placed, each card consisting of a broken circle printed in grey on a black background. One card differs from another in being a lighter or a darker grey, and the object of the test is to

discover which card can just be seen by the observer, the test being carried out in complete darkness except for the small light in A."

The whole apparatus is painted black.

The eyes of the person to be tested must be dark adapted and the test explained. He is then seated at a table in front of the test and the room is made completely dark. The flap A containing the radium luminous substance is then raised and the cards, held vertically against flap B, should be viewed from a distance of 12 inches. An endeavour is then made to perceive the position of the gap in the circles. A notch has been cut in each of the cards in order that the person operating the test can tell the position of the gap in the darkness. The flap A must not be raised until the room is in complete darkness as the radium luminous substance phosphoresces on exposure to light and its luminosity would be temporarily diminished. If the flap is inadvertently raised in light, the apparatus should not be used for some



Dr. Wright's test for night vision.

hours. The disc gradually diminishes in intensity, about 25 per cent in two years, and should then be replaced. The apparatus costs 25s., and the discs can be renewed for 5s.

On using this apparatus it was found that it was difficult in the dark to be certain that the subject was, in fact, 12 inches away from the card. A little over eagerness tended to reduce the distance and to give a better, but false, result.

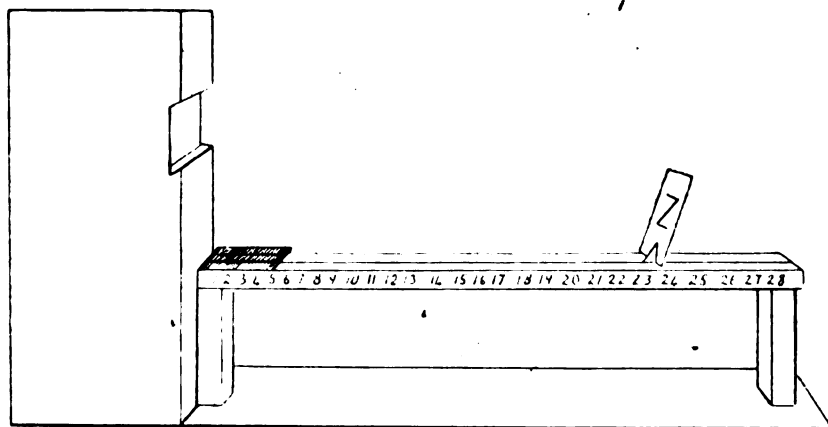
The apparatus itself is somewhat flimsy, and it was doubtful whether it would stand up to heavy and extensive use in the Services as it stood.

The test depended, as in Bishop Harman's test, on white light against a black background instead of the recognition of the reverse.

MODIFICATION OF DR. WRIGHT'S TEST.

The test was consequently modified in the following manner. A wooden box 20 by 10 by 7 inches was obtained from the ration stores and a slit was

cut in the bottom $3\frac{1}{4}$ inches wide 5 inches from one end. The box was then mounted, on the end further from the slit, on a piece of three-ply 38 by $10\frac{1}{2}$ inches. A sliding scale was made of a "bulldog" pattern paper clip, two battens of wood 30 by $1\frac{1}{4}$ by $\frac{3}{4}$ inches and an ordinary tape measure. Flap A of Wright's test, and that part of the wooden container approximating to it when lying flat, was sawn off and mounted on one end of the sliding scale. The whole was then attached to the three-ply in such a way that when flap A was raised it rested against the box with its upper border level with the lower border of the slit. The whole apparatus was then painted matt black including the inside of the box, except for the part of the paper clip directed towards the box which was painted matt white. Ten white cards 5 inches square were made, on each of which was a letter in 36 metre Snellen's type (*see* illustration below).



The modified apparatus.

METHOD OF TESTING.

The A.A. troops to be tested were quartered in huts which were not light-proof. It was therefore more convenient to carry out the test at night and in the following manner. The apparatus is placed on a table covered by a dark grey army blanket and the edge of the box is held firmly, level with the edge of the table, by means of an ordinary screw clamp. If a blanket were not used a noticeable glare was reflected from the table and the clamp prevented the apparatus from being upset in the darkness. All those tested, whether by night or by day, wore pre-adaptation goggles (R.A.F. pattern) for at least forty-five minutes, followed by ten minutes in complete darkness, as it was considered that the increase in retinal sensitivity that occurs after one hour is not appreciable. Those who were tested at night and had been exposed for some time to artificial light were already partially dark adapted but error is less if the time of dark adaptation tends to be long rather than short.

The test was explained to the subject seated at the table in front of the test with the hut in darkness. If spectacles were normally worn they were worn for the test. A card was placed in the clip at about the middle of the scale by the observer, sitting in front and to the right of the subject, and the flap raised. With his head in the box, the subject endeavoured to recognize the letter on the card through the slit. If the letter could be recognized it was moved further away, and vice versa until the furthest point at which the letter could be recognized was reached. This was checked by placing two other cards in the clip and adjusting if necessary. There was a tendency to eye fatigue if the subject strained for too long to see the letter and the letter could only then be read much nearer. If other candidates were in the room, the distance on the scale was read by means of an extremely dim and well-screened torch after closing the flap; otherwise the light could be turned on. The difficulty in making a hut light-proof during the day was overcome by placing a table, folding, flat, on a table, barrack, trestle, six foot. The apparatus slid comfortably under the smaller table, over which an army blanket was draped and allowed to hang down in the form of a tent. The blackout shutters of the hut were placed in position and the door closed. The inside of the "tent" was then completely dark and the test was carried out as before.

The technique of this test does not conform to the strictly scientific and accurate precepts of Mandelbaum who in measuring the sensitivity of the dark adapted retina exposes each subject to the same source of light for a fixed time, dark adapts each subject for a fixed time, exposes the object for a fixed time, and arranges by means of apparatus that the size of the pupils is constant. But it does appear to be a reasonably standard and simple test suitable for use in the field. Instead of using white cards with black letters, Dr. Wright's cards can be used, with advantage, on the modified apparatus if so desired. A difficulty arising from the use of the white cards is to keep them clean.

THE TEST.

Three apparatus as described above were constructed and used to test the night vision of the personnel of an A.A. unit. Three responsible N.C.O.s were instructed in the use of the test and 1,027 men were tested in a little more than five weeks despite frequent interruptions by air co-operation and other duties. The N.C.O.s were also instructed in testing visual acuity with a Snellen's type sight card and the visual acuity of every man, with, and without, spectacles if worn, was tested prior to the night vision test except in the case of those men who had had respirator spectacles issued recently, in which case the visual acuity with, and without, spectacles was taken from the A.B.64. The colour vision of more than three hundred of those taking part was tested by means of pseudo-isochromatic plates (made by American Optical Co. and supplied by Messrs. Theo. Hamblin, Ltd.) in an endeavour to discover the relationship, if any, between colour blindness and night vision.

Other data collected are shown on the proforma below which was filled in for each man. "1st Test" and "2nd Test" on the bottom line refers to the Livingston Rotating Hexagon Test for night vision with which a number of the men had been tested previously.

<i>Name</i>	<i>Date</i>.....194
<i>Rank</i>	<i>Colour of Eyes</i>
<i>Regt.</i>	<i>Visual Acuity</i>
<i>Battery</i>	<i>Without Spectacles</i>
<i>Troop</i>	<i>With Spectacles</i>
<i>Duty</i>	<i>Visual Standard</i>
<i>Age</i>	<i>Colour Vision</i>
<i>Length of Service</i>	<i>Night Vision</i>
<i>Civilian Occupation</i>	<i>1st Test</i>
<i>Town or Country Dweller</i>	<i>2nd Test</i>
<i>Whether Tested on Livingston Hexagon ?</i>	

COMPARISON OF THE APPARATUS.

All three radium luminous discs used were purchased at the same time and each bore the manufacturers warning "Renew before September 1942." In order to test that there was no marked difference between the luminosity of the discs a subject who had a very high night visual standard checked all three apparatus on the same night. Letters were recognized at 27 inches on two apparatus and 26 $\frac{3}{4}$ inches on the third. An attempt was made to compare the luminosity of the discs by means of a grease spot photometer but even after being dark adapted for several hours the intensity of illumination was too low to obtain an accurate result. The results obtained on the three apparatus only varied within reasonable limits.

ANALYSIS OF THE RESULTS.

Those tested were divided into the following age-groups—under 20, 20-29, 30-39, 40 and over. These were further sub-divided into the six visual standards laid down in A.C.I. 1428 of 1941 which are briefly as follows—

Visual Standard 1. Unaided vision is not less than 6/6 in one eye and 6/9 in the other.

Visual Standard 2. Unaided vision is less than V.S.1 but not less than 6/12 6/12 or 6/6 (R.) 6/36 (L.).

Visual Standard 3. Unaided vision is less than V.S.2 but can be corrected to at least V.S.2.

Visual Standard 4. Unaided vision is less than V.S.2 cannot be corrected to V.S.2 but can be corrected to at least 6/12 6/36.

Visual Standard 5. V.S.1-4 cannot be attained but can be corrected to at least 6/24 6/24.

Visual Standard 6. Vision with or without glasses is *not* less than 6/12 in one eye but *is* less than 6/36 in the other.

Visual Standard 4 precludes a man from shooting and V.S. 5 and 6 from both shooting and driving. These standards exclude far more from driving motor vehicles than does the civilian test which only requires the reading of a motor car number plate with or without spectacles at a distance of 25 yards.

The card in the sliding clip could be moved from 5½ to 29 inches from the luminous disc, and the furthest distance at which the card could be seen by each person was recorded. The recordings in the two largest groups are shown below, ignoring fractions of an inch (i.e. 18½ taken as 18) :—

				V.S.1	Age 20-29								V.S.1	Age 30-39			
					%									%			
29	...	...	...	1	0.2	...	...	...	...	1	0.4	...	...	...	...
28	...	...	...	0	0.0	...	...	...	...	0	0.0	...	...	...	...
27	...	...	...	2	0.5	...	...	...	...	1	0.4	...	...	...	...
26	...	...	...	3	0.7	...	...	...	...	3	1.3	...	...	...	...
25	...	...	...	6	1.5	...	...	...	...	3	1.3	...	...	...	...
24	...	...	...	7	1.7	...	...	...	...	7	3.0	...	...	...	...
23	...	...	...	17	4.1	...	...	...	...	4	1.7	...	...	...	...
22	...	...	...	14	3.4	...	...	...	...	8	3.4	...	...	...	...
21	...	...	...	31	7.5	...	...	...	...	15	6.4	...	...	...	...
20	...	...	...	35	8.5	...	...	...	...	14	6.0	...	...	...	...
19	...	...	...	41	9.9	...	...	...	...	16	6.9	...	...	...	...
18	...	...	...	59	14.3	...	...	...	...	23	9.9	...	...	...	...
17	...	...	...	47	11.4	...	...	...	...	31	13.3	...	...	...	...
16	...	...	...	38	9.2	...	...	...	...	24	10.3	...	...	...	...
15	...	...	...	32	7.7	...	...	...	...	16	6.9	...	...	...	...
14	...	...	...	19	4.6	...	...	...	...	16	6.9	...	...	...	...
13	...	...	...	23	5.6	...	...	...	...	19	8.2	...	...	...	...
12	...	...	...	6	1.5	...	...	...	...	14	6.0	...	...	...	...
11	...	...	...	13	3.1	...	...	...	...	7	3.0	...	...	...	...
10	...	...	...	6	1.5	...	...	...	...	2	0.9	...	...	...	...
9	...	...	...	6	1.5	...	...	...	...	3	1.3	...	...	...	...
8	...	...	...	4	1.0	...	...	...	...	3	1.3	...	...	...	...
7	...	...	...	3	0.7	...	...	...	...	2	0.9	...	...	...	...
6	...	...	...	0	0.0	...	...	...	...	1	0.4	...	...	...	...
5	...	...	...	0	0.0	...	...	...	...	0	0.0	...	...	...	...
0	...	...	...	1	0.2	...	...	...	...	3	1.3	...	...	...	...
				414	100%					236	100%						

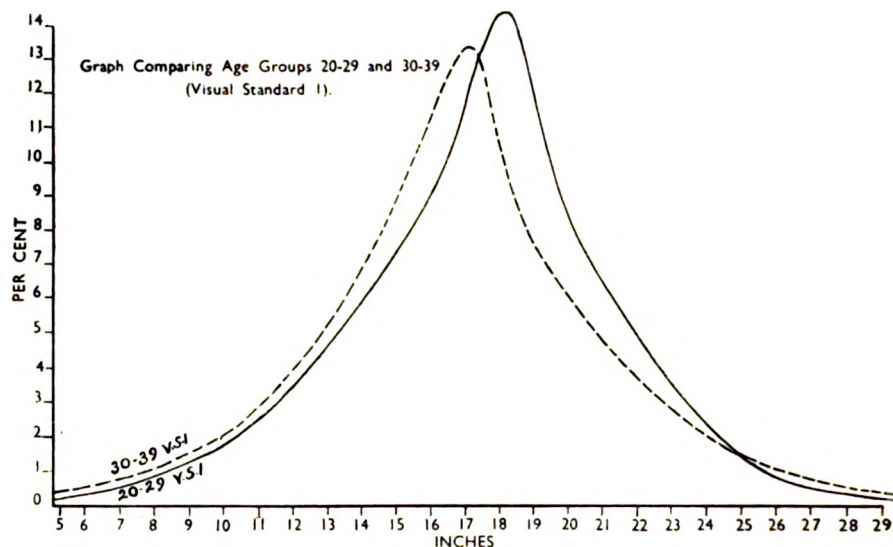
The advisability of placing these results in groups comparable to those in use in the R.A.F. was first considered, in which case the grouping would be as follows :—

		V.S.1	Age 20-29	V.S.1	Age 30-39
			%		%
Exceptional	(24-29)	4.7		6.4	
Above average	(20-23)	23.3		16.3	
Average	(16-19)	44.7		40.2	
Below average	(12-15)	19.3		27.9	
Poor	(0-11)	8.0		9.1	

As the exceptional group was small there appeared to be no value in

separating this from the group below and the final grouping decided upon was as follows: —

	V.S.1	Age 20-29	V.S.1	Age 30-39
		%		%
Night Visual Standard 1 (20-29)		28.0		22.7
Night Visual Standard 2 (16-19)		44.7		40.2
Night Visual Standard 3 (12-15)		19.3		27.9
Night Visual Standard 4 (0-11)		8.0		9.1



These night visual standards were recorded on the training card of each man. The object was to choose "spotters" from N.V.S.1 and night drivers from N.V.S.1 and 2. If really necessary, night drivers could be drawn from N.V.S.3 but it was considered that those in N.V.S.4 should not drive at night.

The complete analysis of the tests in the various Age, Visual Standard, and Night Visual Standard Groups is tabulated below. Nine hundred and thirty of the men tested were in the six groups covered by V.S.1, 2, and 3, and aged 20-29 and 30-39. Only these groups are of any value in comparison, as the other groups are too small.

From the above table it appears that those aged between 20 and 29 in V.S.1 have better night vision than the others. This agrees with Bishop Harman's observations although Mandelbaum has not found this to be the case. Those in V.S.2 are definitely not as good as those in V.S.1 in either age-group. Although those in V.S.3 in the 20-29 group have a high percentage in N.V.S.1 there is also a high percentage in N.V.S.4. On the whole those in V.S.3 (who have had their vision corrected) have a better night visual standard than those in V.S.2.

<i>Visual Standard</i>	<i>Night Visual Standard</i>	<i>Age groups</i>						<i>Total</i>	
		19 & below	20-29	%	30-39	%	40+	No.	%
V.S.1	N.V.S.1	4	116	28.0	53	22.7	2	175	25.5
6/6 6/9	N.V.S.2	13	185	44.7	94	40.2	5	297	43.3
	N.V.S.3	4	80	19.3	65	27.9	7	156	22.7
	N.V.S.4	2	33	8.0	21	9.1	2	58	8.5
Total		23	414	100.0	233	100.0	16	686	100.0
V.S.2	N.V.S.1	1	17	18.1	5	8.1	0	23	13.5
6/12 6/12	N.V.S.2	2	30	31.9	29	46.8	2	63	37.1
or	N.V.S.3	3	34	36.2	18	29.0	2	57	33.5
6/6 6/36	N.V.S.4	2	13	13.8	10	16.1	2	27	15.9
Total		8	94	100.0	62	100.0	6	170	100.0
V.S.3c	N.V.S.1	0	19	27.1	3	5.3	0	22	16.1
spectacles	N.V.S.2	0	23	32.9	30	52.6	2	55	40.1
6/12 6/12	N.V.S.3	1	16	22.9	16	28.1	3	36	26.3
or	N.V.S.4	0	12	17.1	8	14.0	4	24	17.5
6/6 6/36									
Total		1	70	100.0	57	100.0	9	137	100.0
V.S.4c	N.V.S.1	0	0		1		0	1	
spectacles	N.V.S.2	0	1		0		0	1	
6/12 6/36	N.V.S.3	0	4		2		0	6	
	N.V.S.4	0	0		0		0	0	
Total		0	5		3		0	8	
V.S.5c	N.V.S.1	0	0		0		0	0	
spectacles	N.V.S.2	0	1		0		0	1	
6/24 6/24	N.V.S.3	0	1		0		0	1	
	N.V.S.4	0	0		1		1	2	
Total		0	2		1		1	4	
V.S.6c	N.V.S.1	0	1		1		0	2	
spectacles	N.V.S.2	0	7		1		0	8	
6/12 6/60	N.V.S.3	1	3		3		0	7	
	N.V.S.4	0	3		2		0	5	
Total		1	14		7		0	22	
V.S.1-6		Total	33	599	363		32	1,027	

The two largest groups were then added together and subdivided into other groups: visual acuity 6/6 6/6 and 6/6 6/9; town dwellers and country dwellers; light coloured eyes and dark eyes. The results tabulated below showed little of value.

<i>Night Visual Standard</i>	<i>V.S.1</i>		<i>V.S.1</i>		<i>V.S.1</i>		<i>Town Dweller</i>	<i>Country Dweller</i>	<i>Blue Grey Eyes</i>	<i>Brown Hazel Eyes</i>
	20-29	30-39	20-29	30-39	20-29	30-39	20-29	20-29	20-29	20-39
N.V.S.1	28.0	22.7	25.3	25.5	25.8	25.4	26.2	26.1	23.9	
N.V.S.2	44.7	40.2	42.4	43.0	36.2	41.7	45.7	40.2	46.4	
N.V.S.3	19.3	27.9	23.6	22.8	31.0	24.3	20.4	25.8	20.4	
N.V.S.4	8.0	9.1	8.6	8.7	6.9	8.6	7.6	7.8	9.2	
Total in Group		414	233	647	589	58	535	112	390	250

An analysis into occupations proved too complicated to carry out and

its value was also doubtful. The man who obtained the best result and could recognize letters beyond the end of the machine was aged 28, and was a Forestry Warrener in civilian life.

Of the three hundred or so whose colour vision was tested twelve were found to suffer from colour blindness. The distances recorded varied from 8 to 24 inches and the number in each N.V.S. group was as follows:—

N.V.S.1	3	25.0%
N.V.S.2	5	45.6%
N.V.S.3	2	16.7%
N.V.S.4	2	16.7%

Only one set of colour test cards was available and the test should be carried out in daylight. In view of this, and that the above results did not indicate that any significant conclusions were likely to be drawn by further testing with pseudo-isochromatic plates, this test was discontinued.

Eighteen officers were tested and, as in the case of fifteen officers tested on the Livingston Rotating Hexagon, their results were considerably better than the men's results although, of course, the number tested was small.

Officers	No.	%	
N.V.S.1	8	44.4	(7 in V.S.1, 1 in V.S.2.)
N.V.S.2	7	38.9	(5 in V.S.1, 1 in V.S.2, 1 in V.S.3.)
N.V.S.3	2	11.1	(2 in V.S.1.)
N.V.S.4	1	5.6	(1 in V.S.3.)

Only three of this group were tested on the Livingston Hexagon.

COMPARISON WITH LIVINGSTON HEXAGON TEST RESULTS.

Some difficulty was experienced in correlating the results obtained on the modified Wright apparatus and those obtained on the Livingston test. 108 men had been tested on both machines, and of these 83 had been tested twice on the Livingston Hexagon. The methods of marking are very different and the Livingston test depends to a certain extent on mental alertness and intelligence.

CONCLUSION.

A modification of Dr. Wright's apparatus having been used for testing the night vision of 1,027 men, it is considered that the objects enunciated at the beginning of this report have been achieved.

I am again indebted to Lieutenant-Colonel B. Chichester Cooke, R.A., Commanding Officer, 33rd S.L. Regt. R.A., whose full co-operation made this investigation possible.

My thanks are also due to the National Physical Laboratory for much advice.

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THE FORWARD MEDICAL SERVICES OF THE RED ARMY.

BY MAJOR-GENERAL E. M. COWELL, *C.B., C.B.E., D.S.O., T.D.*

INTRODUCTION.

THE material for this article has been obtained from a verbatim translation by Lieutenant L. Crome, R.A.M.C., of the Regulations for the Medical Services of the Armies of the U.S.S.R. (1941), and supplies many of the answers to the blitzkrieg problems as described in the JOURNAL in February and March of last year.

HYGIENE AND ANTI-GAS MEASURES.

The Red Army places a high value on hygiene; the importance of personal and collective hygiene is stressed and made a unit commander's responsibility. Anti-gas measures, too, are constantly emphasized.

DEFENCE OF MEDICAL SERVICES.

Medical commanders are responsible for the defence of their units. This includes the selection of protected and tank-proof localities, camouflage, adoption of measures against ground and air attack, construction of shelters and anti-gas protection.

The continuation of medical work must be ensured, even during an enemy attack.

Medical sub-units will be dispersed so that they offer minimum artillery targets and at the same time are still under control. The defence sub-unit is always appointed by the medical commander. When attacked, the nearest unit is notified but the medical section engages the enemy actively until relief arrives.

Medical units should be able to construct simple shelters without sapper aid. The defence plan includes a lookout post, alarm system, shelters, slit trenches and fire-fighting.

EDUCATION AND TRAINING OF MEDICAL PERSONNEL.

The subjects for technical training are: A knowledge of practical methods required in war, proficiency in the use of equipment, general military and tactical methods and the organization of the medical services; for battle—first-aid on the battlefield includes methods of carrying wounded, protection from enemy fire and loading of casualties into transport.

The officers must also study triage, hygiene, the organization of forward evacuation, immobilization of fractures and anti-shock treatment.

Officers are encouraged to attain proficiency in these duties and those of the rank above.

GENERAL PRINCIPLES OF MEDICAL ARRANGEMENTS.

The infantry brigade (regiment) contains the following medical sub-units: —

- (1) Medical company of the brigade.
- (2) Medical platoons of battalions.
- (3) Medical sections of companies.
- (4) Medical sections forming ambulance posts.

The medical services may be reinforced by handsmen, soldiers of the line, etc., as auxiliary stretcher bearers, and also by general transport.

The service aims at the provision of prompt first-aid and early evacuation, both of which are essential for successful surgical treatment.

In modern warfare, complicated situations may follow rapidly of movement and difficulties arise owing to the multiplicity of injuries and the necessity for working under fire. The objects of the medical services are to save life, conserve man-power and prevent invalidism and it works in close co-operation with unit and sub-unit commanders, who are responsible for the health of troops and evacuation of casualties.

The following types of treatment are carried out in forward areas: —

Immediate first-aid, applied by the soldiers themselves or medical orderlies, using the first field or anti-gas dressing:

“ Pre-surgical ” aid, in infantry companies, by medical instructors (Serjeants, Medical Corps), and at the battalion medical point (R.A.P.) or ambulance post (Car Post) by a feldsher, i.e. unqualified doctor's assistant; First surgical aid by a doctor at the regimental medical point (A.D.S.).

Continuity of treatment is attained by the use of field medical cards and placing medical establishments in echelon. Triage is essential at all stages to ensure the sorting and correct disposal of cases in order of priority and urgency.

MEDICAL ARRANGEMENTS IN AN INFANTRY COMPANY.

There is a medical section consisting of a small number of men under the command of a medical instructor. He must know the operational task of the infantry company, the location of the command post, the company supply point, the position of the medical platoon of the battalion, the ambulance post and the A.D.S. He arranges all details, including signals for the stretcher bearers, routes for evacuation and replenishment of equipment. During battle he remains near the command post.

The medical orderlies are attached to an infantry platoon and render first-aid, place serious cases under cover, direct walkers to the R.A.P. and mark the spot where casualties are lying.

They call the commander of the medical section to serious cases and summon stretcher bearers when necessary. The medical orderly may himself dig a trench for protection of the wounded; such places are called “ casualty nests.”

Medical orderlies carry out their work under camouflage and concealment

continuing their work uninterruptedly in battle and taking advantage of favourable moments for movements. When there is heavy enemy fire on an area from which casualties have to be evacuated the medical section commander may ask for neutralization of the fire points.

The administration of first-aid on the field of battle demands self-sacrifice, courage, endurance and also the ability for skilful adaptation to the terrain.

The Company on the March.—On receipt of the warning order, the medical section commander reports to the company commander and checks up with the platoon commanders the state of the feet, boots, water bottles and all details.

On the march the medical orderlies attend to those who fall out, leaving them at the roadside to be picked up by the medical transport of the battalion.

At the end of the day's stage the medical section commander inspects the billeting area. If there is bathing in open water, a medical orderly is detailed as a life-guard.

In Attack.—In attack, the medical orderlies place the casualties under cover, mark the spot and advance.

In a night attack extra stretcher bearers will be required, landmarks noted in daylight and routes marked.

In traversing a water obstacle, the company commander organizes rescue of anyone in danger of drowning. A medical post is set up on the near bank, being transferred to the far bank when the company is across.

In Defence.—In defence, a reconnaissance is made of the company area and sites for casualty nests and evacuation routes are marked out. In retreat, all lying cases are cleared with the help of extra bearers detailed by the company commander.

MEDICAL ARRANGEMENT FOR AN INFANTRY BATTALION.

A medical platoon is attached to each battalion, commanded by a feldsher or sometimes a doctor.

His duties are to clear the companies, supervise treatment, give pre-surgical aid and evacuate through the care post to the A.D.S. He is responsible for the health of the troops, provision of medical supplies and carrying out medical reconnaissance.

The R.A.P. is opened $\frac{1}{2}$ to 1 k. from the front, under instructions from the battalion commander. Evacuation routes from the companies are mapped out and the location of ambulance posts decided. The feldsher supervises the work of the medical instructors and clears their casualties by moving up ambulance posts as far as possible or by organizing bearer relay posts at ten to fifteen minute intervals. In difficult circumstances a chain of auxiliary stretcher bearers from the medical company, or dogs, may be employed to search for the wounded.

In face of heavy fire he asks the battalion commander to order neutralizing fire or bring up tanks.

Medical transport is brought well up and carefully camouflaged. Ambu-

lances may be stationed at 100 to 200 metre intervals to move on the endless belt principle. Triage is performed and casualties are evacuated according to the following priority:—

Hæmorrhage; abdominals and chests; shock, with anti-shock measures.

Lightly wounded or sick may be returned to their units.

Simple records are kept; touch is maintained with the battalion command post, section commanders and the senior medical officer (S.M.O.) of the brigade. This is carried out by means of the telephone, stretcher bearers, ambulance transport or special runners.

All medical posts, including the R.A.P., are organized in four main departments: Reception and triage, Treatment, Retention, and Evacuation.

"Alert" sentries, signposting and defence are insisted upon.

On the March.—On the warning order all sick are evacuated. On the road, the medical platoon with the stretcher bearers and medical transport follow in the rear of the battalion. The medical platoon commander examines casualties on the roadside, returns them to duty or evacuates them. If there are numbers of casualties personnel may be left behind to look after them.

In Attack.—The medical platoon is kept with the reserve company close to the battalion command post. During the advance, the platoon works forward, opening up an R.A.P. where there are most casualties. Stretcher bearers and ambulances are sent up to clear the company casualty nests; the medical platoon commander adjusts dressings, performs triage, gives pre-surgical aid and arranges evacuation to the A.D.S.

For a night attack and in crossing a water obstacle arrangements are made as described for a company.

In Defence.—During the period of organization, the platoon commander makes a reconnaissance, selects a "square" for the R.A.P. to allow of the departments being laid out on the scatter and dispersal principle; marks out evacuation routes; plans defence and protection; supervises hygiene and the water supply; reports to the battalion commander and S.M.O. and issues instructions to the medical section commanders.

The battalion commander orders the erection of a shelter for the R.A.P., which is linked by telephone with battalion and company headquarters.

A communication trench may be dug to facilitate clearing under fire: roads may be repaired and signposted.

If the battalion is encircled, the R.A.P. is located in the centre and casualties brought in from the companies. Pre-surgical aid is rendered, triage performed and arrangements are made for evacuation as soon as roads are open. Armed escorts may be needed during this evacuation.

MEDICAL ARRANGEMENTS FOR AN INFANTRY BRIGADE.

S.M.O.—Control of the medical services is carried out by the senior medical officer, based on instructions from the brigade commander, the

divisional medical staff officer (A.D.M.S.) and an appreciation of the military situation.

In making his plan, he gives the location of the A.D.S., details personnel, allocates transports and issues instructions to the medical platoon commanders (R.M.O.s).

This plan is reported to the brigade commander and a draft medical graph is prepared for insertion in administrative orders.

In battle, he will be found where he can exert personal control and at the same time remain in touch with brigade headquarters. When there are large numbers of wounded, he will assist at the A.D.S.

Communications are maintained with brigade and division; messages may be sent by ambulance orderlies, drivers or runners.

The S.M.O. keeps a working map of operations, supervises the collection and consolidation of returns, forwards returns to the higher formation, writes a war diary and is responsible for the replenishment of medical supplies and equipment.

He is responsible for the hygiene of the brigade, organizing inspections, inoculation, disinfection and "quinization." He is responsible for medical reconnaissance and the control of the medical services of the brigade.

The Medical Company.—The medical company opens an A.D.S. under command of the medical company commander. Its function is to clear the battalions and provide treatment for casualties. The company consists of the following platoons: medical, transport, dog, defence.

The A.D.S. provides for the care of casualties, triage, first surgical aid and preparation for evacuation. First surgical aid includes the adoption of essential measures, anti-shock treatment, control of bleeding, immobilization of fractures.

Here records are made on field medical cards. The A.D.S. is situated 2-5 k. from the front, is well camouflaged, has covered access to the rear and good entries from the front.

The "square" is large enough to allow dispersal of sections.

The medical company must be able to open up in 15-20 minutes after arrival and be organized in two independent sections. Its location is notified to all concerned. The following departments are established: control, reception and triage, dressing, evacuation and isolation.

Evacuation is carried out to the divisional medical post (F.D.S.) without delay, under divisional arrangements. Slightly wounded may be sent back in ordinary vehicles; returned to their units or transport lines; employed for work in the A.D.S.

The defence plan is made as already described.

The medical company obtains its supplies from division and meets the requirements of medical platoons and sections.

On the March.—On receipt of the warning order, the route and tactical conditions are investigated and the staging areas studied. Medical personnel are distributed in the columns as under:

Medical sections and platoons as already described.

The medical company in the first rear echelon.

The S.M.O. remains with brigade headquarters.

At the main halts, sick and casualties are seen, treated, and evacuated. When attacked, casualties are treated and sent back to pre-arranged medical posts, or new medical posts may be established, cleared by the division.

In Attack.—The A.D.S. is sited as near as possible to the start line. Medical platoons are reinforced and reserves provided. Ambulance posts are located and evacuation routes marked out. The S.M.O. keeps in close contact with brigade headquarters and maintains contact with the medical platoons of battalions.

The A.D.S. is only moved up after consultation with brigade headquarters.

In Defence.—In addition to the measures already outlined, the S.M.O. decides on the engineer work required; shelters, slit and communication trenches, water storage, latrines, sumps, etc.

The A.D.S. is usually sited in the reserve battalion area where a special shelter is built and equipped.

Uninterrupted communications with all sub-units are necessary.

Special arrangements may be required for sub-units in the supply zone and battalions fighting in isolated positions.

When the roads are suitable, evacuation may be direct from R.A.P.s to M.D.S., special attention being paid to the defence of the medical transport.

When disengagement is ordered, auxiliary stretcher bearers will be required.

Medical posts are moved in echelon and cleared direct to division.

The Brigade at Rest.—The medical reconnaissance of the rest area is carried out to investigate the health of the inhabitants, local medical resources, baths, etc., and the water supply.

The S.M.O. participates in the plans for resting the brigade, which should ensure the maximum improvement in the health and strength of the troops.

An A.D.S. is established for treatment and inspections. Minor cases may be detained and accommodation provided for casualties resulting from air attack.

During this rest period, the S.M.O. replenishes medical supplies, organizes medico-educational work, teaching of first-aid, collective training of the medical personnel, and provides the whole of the brigade personnel with individual medical equipment.

During Rail Transport.—Arrangements are made in the en- and de-training areas. Medical sub-units are distributed in the echelons and arrangements made for the evacuation of casualties on the journey.

An isolation carriage is attached at the tail end of each train.

The R.M.O. carries out medical supervision during the journey and cleansing of all troops is performed every eight days or immediately lice are found or typhus occurs.

Editorial.

NINETEENTH ANNUAL REPORT OF THE BRITISH EMPIRE CANCER CAMPAIGN, 1942.

"MEDICAL research to-day is an essential war activity; from that activity no disease or group of diseases can be excluded." So runs the first paragraph of the Summary of the Report and the Editor, Mr. J. P. Lockhart-Mummery, F.R.C.S., F.A.C.S., speaks enthusiastically of the fine cancer research which has been possible even in the three years of war that have passed. "The Campaign is able to-day to make the proud boast that since the war began it has been possible to subsidize to the fullest extent every research centre associated with this Campaign. A sum of just under £100,000 has been spent and work, the importance of which is known throughout the whole world, has gone forward without serious interruption."

A research on the action of croton resin and other irritants in relation to carcinogenesis has modified the conception of the biological mechanism of tumour production. The stages of this process, "the conversion of normal into pre-neoplastic skin (pre-cancerous action), the change from pre-neoplastic skin into papillomata (epi-carcinogenic action) and the transformation of these papillomata (meta-carcinogenic action) into malignant growths were generally thought to be consecutive stages of one single carcinogenic process. The present work has shown that there are substances which, although incapable of inducing the pre-cancerous state, are strongly epi-carcinogenic and also possess some meta-carcinogenic action. Hence carcinogenesis may be resolved into independent components and the substances concerned in the process may be divided into 'complete' carcinogens when they are able to induce all three actions and 'incomplete' carcinogens when, like croton resin, they can induce only some, but not all, of the components of the carcinogenic process."

Drs. Berenblum and Schoental, working at the Sir William Dunn School of Pathology at Oxford, have carried out these researches. The existence of "incomplete" carcinogens may prove later on to be of importance in the clinical study of cancer-production.

These workers have also carried out investigations into a sensitive new method by which the quantitative estimation of benzpyrene from animal tissues may be carried out and the application of this process to the study of the rate of disappearance of benzpyrene from the animal body under different biological conditions examined (Berenblum, I., and Schoental, R. 1942. "The quantitative estimation of 3: 4-Benzpyrene in whole animals, their tissues and excreta." *Biochem. Journ.*, **36**, 86; and "The Rate of Disappearance of 3: 4-Benzpyrene from the Mouse after Subcutaneous and

Intraperitoneal Injection." *Ibid.*, 36, 92). Benzpyrene was found to disappear from the mouse about fifteen times more rapidly when introduced intraperitoneally than when applied subcutaneously. "From any one site of injection, the rate of disappearance at any given time was found to be proportionate to the logarithm of the concentration, irrespective of the amount originally injected." Tumours were readily developed at the site of injection when benzpyrene persisted for a long time, as, for instance, in the subcutaneous tissues, but no tumours were seen to develop when the benzpyrene was rapidly got rid of as in the peritoneal cavity.

"With the disappearance of benzpyrene, a milky blue fluorescence in ultra-violet light took the place of the characteristic violet fluorescence at the site of injection and persisted till the animals died. This was found to be due to an impurity, not readily metabolized by the tissues, present in small amount in the originally injected benzpyrene."

The research favours the view that carcinogenesis is dependent on unchanged benzpyrene in the tissues.

At the Strangeways Research Laboratory at Cambridge, Dr. Glücksmann has continued to work at the skin tumours produced by benzpyrene in mice and is developing a technique for producing single tumours. It is customary to carry out quantitative histological analysis of the tumour material during the period of malignant change "and the 'treatment' of the induced tumours by radiation has now begun." This quantitative histological analysis appears to be very important and is being applied to human cancer biopsies with good effect.

"A number of separate investigations has been made including a histological analysis of a series of cases of carcinoma of the cervix, all treated in the same hospital by a standard technique. The analysis revealed that three histological types of tumour were included in the single clinical classification and that these types did not respond to irradiation equally well. It was possible to classify the tumours from an examination of the pre-radiation biopsy and thus distinguish before treatment the cases which were likely to cause difficulty."

Dr. J. G. Carr, at the Institute for Animal Genetics, University of Edinburgh, has tested the susceptibility to the Rous No. I Agent of nearly two hundred fowls "in connexion with Greenwood's genetical work on the inheritance of the atypical response shown by a particular inbred line." Some of the birds retained for breeding developed a Rous tumour induced by the test inoculation at the age of six weeks. These late tumours are devoid of the virus though it is present in normal amounts in grafts grown in young birds.

In a note on Carcinoma of the Œsophagus and Post-Cricoid Carcinoma by the Clinical Cancer Research Committee, excessive consumption of alcohol was found to be high (16 per cent) in œsophageal carcinoma in males. 20 per cent of the male patients and 22 per cent of the females admitted addiction to very hot food and liquids; 17 per cent of males and 12

per cent of females were found to be in the habit of hasty eating and insufficient mastication. The figure for the influence of excessive alcohol in œsophageal and post-cricoid carcinoma in males appears to be significant but the other percentages are of too general a character to count and no control figures are available. As to the sex incidence of œsophageal carcinoma and post-cricoid carcinoma, the males appear to predominate to a large degree in the first, the females in the second. Dr. Percy Stocks, to whom the figures were submitted, makes his comments as follows: "Of sixty-five cases of post-cricoid cancer, fifty-four were females, a percentage of 83.1 ± 4.6 , whereas, of 473 cases of œsophageal cancer, only seventy-six were females, a percentage of 16.0 ± 1.7 , the difference being significant beyond question." We are promised the clinical characteristics of these cases, along with growths of the pharynx and larynx, in a later tabulation.



Clinical and other Notes.

A REPORT ON AN INVESTIGATION INTO THE CHARACTERISTICS OF NEW TYPES OF NON-MANNITOL-FERMENTING BACILLI ISOLATED FROM CASES OF BACILLARY DYSENTERY IN INDIA AND EGYPT.

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THE object of this paper is to place on record the findings of an investigation extending over a period of five years into new types of non-mannitol-fermenting organisms isolated from cases of bacillary dysentery in India and Egypt. (The Egyptian strains were received from Lieutenant-Colonel D. W. Beamish, R.A.M.C., in June, 1939.) Type strains and antisera of these new types are available at the District Laboratory, Quetta, India, and the Emergency Vaccine Laboratory, Military Hospital, Tidworth.

It is hoped that the findings of this investigation in conjunction with Boyd's work on the mannitol-fermenting organisms may assist in clarifying the relationship of the dysentery bacilli.

(i) INTRODUCTION.

This investigation has been closely associated with the general routine work on dysentery at the District Laboratory, Quetta.

In 1932 and 1933 there was a large increase in the number of cases of dysentery in Quetta. It was during this period, when over fifteen hundred cases of dysentery were being investigated, that a number of so-called "inagglutinable" strains of *B. dysenteriae* Shiga and *B. dysenteriae* Schmitz was reported by Large. His work is fully described in the *Journal of the Royal Army Medical Corps* for August-November, 1934. The investigation was interrupted for a short period by the disastrous earthquake at Quetta in May, 1935. In October, 1936, the conduct of the investigation came into my hands. Any conclusions reached are based on personal observations, some of which differ from those previously described by Large.

Only two types of non-mannitol-fermenting organisms are at present recognized as being capable of causing bacillary dysentery. These are *B. dysenteriae* Shiga and *B. dysenteriae* Schmitz. It would appear that Dudgeon's *B. para* Shiga (Indol +) and Andrews *B. ambiguus* were probably *B. dys.* Schmitz but serological evidence that they are identical is lacking.

Throughout the literature references are made to both indol-negative

and indol-positive non-mannitol-fermenting bacilli which are inagglutinable with *B. dys. Shiga* and *B. dys. Schmitz* antisera. The best known of these are Dudgeon's *B. para Shiga*, and Ornstein's *B. fallax* and *B. inconstans*. But, as serological data of their relationship to other dysentery organisms are not readily available, it is difficult to assess the relative importance of these organisms. Boyd (1935) refers to three non-indol producing strains that he occasionally found. Archer (1933) described a strain, isolated at Wellington, which differed from *B. dys. Shiga* in producing acid in dulcitol.

From October, 1936, to the end of April, 1941, 154 non-mannitol-fermenting strains have been fully investigated. With the exception of two strains received from England and three from Egypt all strains were isolated at different military laboratories in India. All were inagglutinable with *B. dys. Shiga* and *B. dys. Schmitz* antisera.

It was soon found that as the strains first investigated possessed so great a variety of morphological, cultural and biochemical reactions it would be necessary to define the characteristics of members of the group to be studied. These were based on those exhibited by *B. dys. Shiga* and *B. dys. Schmitz*.

Definition of the Non-Mannitol-Fermenting Group.

The organisms are gram negative, non-capsulate, non-sporing and non-motile coliform bacilli. They ferment glucose but neither is lactose nor a 2 per cent solution of mannitol fermented in fourteen days. Gelatin is not liquefied and the growth of the colonies is non-spreading on phenol-agar or 1½ per cent nutrient agar. The different types must have no serological relationship with the Flexner-Boyd-Newcastle group of dysentery bacilli and are divided into two main subgroups according to their production or non-production of indol.

Of the 154 strains investigated 107 were found to have these characteristics and could be grouped serologically as one or other of new non-mannitol-fermenting types. Eight strains were found to be serologically identical with some members of the Flexner-Boyd-Newcastle group. The remaining thirty-nine strains form a heterogeneous subgroup of organisms, some of which are undoubtedly related to the proteus group. There is no evidence available at present to suggest that any of these organisms are capable of causing dysentery.

(ii) BIOCHEMICAL CHARACTERISTICS.

The fermentation reactions of a number of carbohydrates and alcohols were studied—viz. lactose, glucose, mannitol, dulcitol, saccharose, adonite, arabinose, inulin, maltose, raffinose, rhamnose, salicin, xylose and sorbite. With the exception of those given in Table I below, no carbohydrate or alcohol gave reactions which were considered to be of importance in differentiating types.

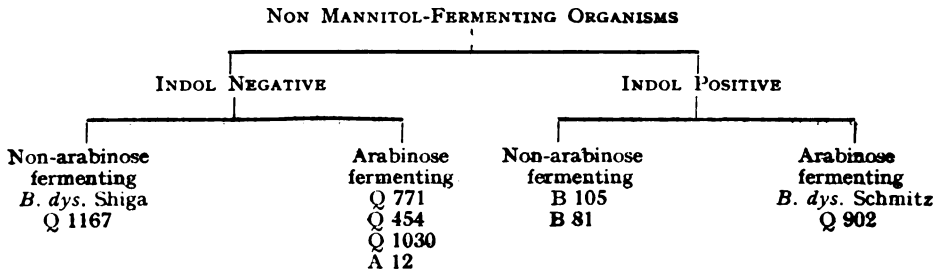
TABLE I.

	<i>B. dys.</i> Shiga	Q 1167	Q 771	Q 1030	Q 454	A 12	<i>B. dys.</i> Schmitz	Q 902	B 105	B 81
Lactose	.. —	—	—	—	—	—	—	—	—	—
Glucose	.. A (1)	A (1)	A (1)	A (1)	A (1)	Ag (1)	A (1)	A (1)	A (1) or Ag (1)	A (1)
Mannitol	.. —	—	—	—	—	—	—	—	—	—
Dulcitol	.. —	—	—	A (2)	—	—	ALK(1)	ALK(1)	ALK(1)	ALK(1)
Arabinose	.. —	—	A (1)	A (1)	A (1)	Ag (1)* to A (7)	A (1)	A (1)	—	—
Saccharose	.. —	—	—	—	—	—	—	—	A (5)	A (4)
Phenol Red	Sl.	Sl.	A (1)	A (1)	A (1)	A (2)	A (1-4)	ALK 5	ALK 3	ALK 4
Milk	a (1)	a (1)	or Sl. a (1)	—	—	—	—	—	—	—
Gelatin†	.. —	—	—	—	—	—	—	—	—	—
Indol.	.. —	—	—	—	—	—	+	+	+	+

* Gas is generally absorbed by the seventh day.

† Gelatin not liquefied.

(a) The biochemical reactions given in Table I have been so constant throughout the investigation that it is possible to make a preliminary biochemical classification of the members of this group. This is given below :



(b) From the findings detailed in Table I it is evident that only Q1167 is biochemically similar to *B. dys.* Shiga.

The types Q771, Q454, Q1030 and A12 differ in being arabinose-fermenters, while Q1030, also differs in being a dulcitol-fermenter.

Of the three new indol-producers Q902 is very similar and only differs from *B. dys.* Schmitz in producing very marked alkalinity in phenol red milk while all strains of the latter examined here were found to produce a permanent acidity.

The types B105 and B81 differ in being saccharose but not arabinose fermenters and by producing a marked alkalinity in milk.

(3) ANTIGENIC STRUCTURE.

(a) Serological Relationship to Mannitol-Fermenting Types.

Cross agglutination tests failed to show any relationship between the types described and the classical Flexner and Boyd types of mannitol fermenters.

(b) Serological Relationship between the Non-mannitol Type described.

With the exception of slight cross-agglutination between *B. dysenteriae* Schmitz and B 105 the types remained serologically distinct.

(c) *Bacterial Variation.*

The only variation found up to the present is the S—R type. This characteristic is exhibited by all the new types, but is especially well marked with Q1030, Q771 and Q454. One Egyptian strain of Q771 produced three types of colonies.

(i) Small smooth clear cut colonies which only gave rise to the S type of colony.

(ii) A large rough colony with central papillæ and an indented margin. This gave rise to both S and R type colonies.

(iii) A colony intermediate in size which appeared more R type than S, but with no central papillæ. This gave rise to all three types of colonies.

(4) DISTRIBUTION AND FREQUENCY OF OCCURRENCE OF THE NEW TYPES.

The distribution of these new types is given in Table II, and an analysis of the Quetta and all India figures in Tables III and IV.

TABLE II.

	Quetta	Karachi	Bombay	Murree	Rasmak	Kohat	Peshawar	Lahore	Abbottabad	Dalhousie	Kasauli	Bangalore	Trimulgherry	Allahabad	Jhansi	Jubbulpore	Cairo—Egypt	Total
Q1167	5	—	2	1	3	1	—	—	—	—	—	—	—	—	—	—	—	12
Q1030	10	—	1	—	2	—	—	—	—	—	1	1	—	—	—	—	1	16
Q771	7	—	1	—	1	3	6	3	—	—	—	—	—	—	—	4	2	27
Q454	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	3
A12	9	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	10
Q902	12	1	1	—	3	3	2	—	—	1	1	—	1	1	—	2	—	28
B105	1	—	—	—	—	—	—	—	—	—	—	3	—	—	1	—	—	5
B81	3	—	—	—	—	—	—	—	—	—	—	2	—	1	—	—	—	6
Totals	49	1	5	1	9	7	8	3	1	1	2	6	1	2	1	7	3	107

(a) From Table II it would appear that the new types, particularly Q1030, Q771 and Q902 have a wide distribution in India and possibly Egypt.

TABLE III.—ANALYSIS QUETTA AND ALL INDIA FIGURES FOR THE YEARS 1938-40.

	Mannitol-Fermenting				Non-Mannitol-Fermenting										Totals
	Andrews V-Z Spectrum	Boyd's types 170, P119 & 103	Boyd's types 88, P288, 274 D1, D19	<i>B. dys.</i> Sonne	Non-arabinose fermenting <i>B. dys.</i> Shiga	Indol Negative				Indol Positive					
						Q1167	Q771	Arabinose fermenting		Arabinose fermenting <i>B. dys.</i> Schmitz	Non-arabinose fermenting				
								Q1030	Q454		A12	Q902	B105	B81	
Quetta	188	63	88	107	38	1	6	9	2	6	25	12	—	3	548
Totals															
All India	4945	617	799	1603	1047	9	12	13	3	6	695	24	1	3	9777
Totals															
Quetta %	34.31	11.5	16.06	19.53	6.93	4.38					4.56	2.74			
All India %	50.58	6.31	8.17	16.4	10.71	.44					7.10	.29			

TABLE IV.—ANALYSIS QUETTA AND ALL INDIA FIGURES FOR 1938-40.

	Mannitol-Fermenting	Non-Mannitol-Fermenting
Quetta	81.39%	18.61%
All India	81.46%	18.54%

(b) From the above figures it is interesting to note that the total percentage of mannitol and non-mannitol-fermenting organisms (Table IV) for all India and Quetta is almost identical. But on analysing the figures for the different members of each group, it is found that the proportion of new types in both groups is higher for Quetta than for all India.

As these new types are so widely distributed in India, it appears that a number must be missed and, until every strain isolated is fully investigated serologically, this is bound to continue.

(5) CRITERIA OF PATHOGENICITY.

As stated by Boyd (1940) it is very difficult to satisfy Koch's postulates in the case of dysentery bacilli. He has, however, given certain characteristics which lend strong presumptive evidence of pathogenicity.

First, is the period of the disease during which the suspected organisms are found in the stools. In the case of organisms which are undisputed pathogens, such as Shiga's bacillus, they are present in large numbers, sometimes in pure culture, early in the disease; they become less common and more difficult to isolate as the case advances and, when recovery ensues, they disappear completely.

The day of the disease on which these new types were isolated is given in Table V (a). A similar analysis for mannitol-fermenting types isolated during 1940 is given in Table V (b).

TABLE V (a).

		Day of Disease							Total
		Types	1	2	3	4	5	6	7
Indol negative	Q1167	4	5	3	—	—	—	—	12
	Q1030	4	7	4	1	—	—	—	16
	Q771	3	13	11	—	—	—	—	27
	Q454	1	2	—	—	—	—	—	3
	A12	1	6	3	—	—	—	—	10
	Totals		25	44	26	5	4	1	107
Indol positive	Q902	10	6	3	3	3	1	2	28
	B105	1	3	1	—	—	—	—	5
	B81	1	2	1	1	1	—	—	6
Totals			25	44	26	5	4	1	107

TABLE V (b).

		Day of Disease							Total
		Types	1	2	3	4	5	6	7
V	—	2	2	1	1	—	6
W	4	7	7	6	2	—	26
X	3	7	8	4	2	—	27
Z	—	4	7	3	1	1	16
103	—	1	3	2	2	—	8
P119	—	6	5	—	2	1	15
170	—	1	3	1	1	—	7
88	7	12	5	3	2	1	30
288	—	—	—	—	—	1	1
Sonne	2	12	6	3	1	—	24
Totals			16	52	46	23	14	5	160

Second, the bacillus should not be present in the bowel, and so in the stool, of persons who are not suffering from acute or chronic dysentery. The data for this are available from the laboratory records of examinations carried out on cooks, table boys, water carriers and others of this class to ensure that they are not carriers of enteric or dysentery bacilli. During the seven years 1934 to 1940, 5,693 men of this type were examined and 15,903 platings were made from their stools. The following organisms of dysentery or query dysentery bacilli were isolated:—

TABLE VI.

Type Numbers %	Mannitol-Fermenting <i>Flexner-Boyd</i>		Non-Mannitol-Fermenting			
	20	<i>Sonne</i> 3	<i>Shiga</i> 3	Q1167 1	<i>Schmitz</i> 2	Q902 2
	0.14			0.05		

In addition Morgan No. 1 bacillus was isolated ten times from menials.

Analysis of the type of exudate present in the cases from which the 107 strains were isolated is given in Table VII (a).

TABLE VII (a)

	Q1167	Q1030	Q771	Q454	A12	Q902	B105	B81	Total
Bacillary exudate	9	11	13	3	7	16	1	2	62
Indefinite exudate	3	5	11	—	2	10	3	4	38
No exudate	—	—	3	—	1	2	1	—	7
Totals	12	16	27	3	10	28	5	6	107

In no case was any other dysentery organism isolated.

For comparison a similar analysis for mannitol-fermenting organisms isolated during 1940 is given in Table VII (b).

TABLE VII (b)

	V	W	X	Z	103A	P119	170	88	288	<i>Sonne</i>	Total
Bacillary exudate	3	15	17	12	5	9	3	21	1	18	104
Indefinite exudate	2	10	8	4	2	6	3	6	—	4	45
No exudate	1	1	3	—	1	2	1	3	—	2	14
Totals	6	26	28	16	8	17	7	30	1	24	163

Third, the development, and especially the progressive development, of agglutinins for the suspected organisms in the serum of the patient during the course of the disease is generally to be accepted as an indication that the defences of the body are being called into action to repel the attacks of an invading organism. This evidence is of value when the agglutinins are for the specific antigen of the bacillus.

TABLE VIII.

<i>Suspensions</i>			<i>Patients' Sera</i>						
			0	25	50	125	250	500	<i>Totals</i>
Q1167	..	..	2	1	1	1	1	—	6
Q1030	..	..	1	2	4	3	1	—	11
Q7	..	..	1	1	8	3	1	—	14
Q454	..	..	—	1	—	1	1	—	3
A12 ..	..	..	2	1	4	—	1	1	9
Q902	..	..	1	2	5	4	3	—	15
B105	..	..	—	2	—	—	—	—	2
B81 ..	..	..	—	1	1	—	—	—	2
Totals			7	11	23	12	8	1	62

An analysis of the serological findings of sixty-two cases carried out on different dates during the disease showing the maximum titre of the specific agglutinins in the sera are given in Table VIII.

Sera from 200 cases and blood donors sent for the Wassermann tests were tested. No agglutinins for the new types were found among these.

From the tables given in this section it would appear that the following conclusions may be drawn:

(a) The greater number of the organisms, i.e. 90 per cent, were isolated during the first three days of the disease.

(b) These organisms are not present in the stools of persons except when they are suffering from acute or chronic dysentery. Of the new types 93 per cent were isolated from cases of acute dysentery compared with 91 per cent from the control mannitol-fermenter.

No other pathogenic organism was isolated from any of the cases caused by a mannitol or non-mannitol-fermenter.

(c) The great majority of cases showed the presence of a progressive development of homologous agglutinins, rising in some instances to a maximum titre of 250 to 500.

It would therefore appear that there is strong presumptive evidence of pathogenicity for all the new types.

Owing to the relatively few organisms of each type examined, final judgment must be suspended until more organisms are isolated and investigated.

It is, however, interesting to note that in one family both husband and wife were infected by Q1030.

(6) RELATIONSHIP BETWEEN THE INFECTING ORGANISMS AND THE SEVERITY OF THE DISEASE.

Table IX shows the relationship between the infecting organisms and the severity of the disease.

TABLE IX.

	Q1167	Q771	Q1030	Q454	A12	Q902	B105	B81
Mild.. ..	6	16	9	2	7	15	3	3
Moderately Severe..	4	8	1	—	1	8	1	3
Severe	2	3	6	1	2	5	1	—
Totals	12	27	16	3	10	28	5	6

(a) These new types appear to be capable of producing a mild or severe type of dysentery.

(b) Q771, Q902 and A12 appear to be capable of producing a more chronic type of dysentery.

This is especially the case with Q902. Five cases continued to show symptoms from ten to twenty-three days after the onset of the illness; two of these chronic cases responded well to treatment by autogenous vaccine.

SUMMARY AND CONCLUSIONS.

(1) The biochemical reaction and antigenic structure of eight new types of non-mannitol-fermenting organisms isolated from cases of dysentery occurring in India and Egypt have been described.

(2) A preliminary biochemical classification of non-mannitol-fermenting organisms is given. These new types are widely distributed in India and are not described in "A System of Bacteriology" (1929). With few exceptions they have been found only in the stools of clinical dysentery cases.

(3) The presumptive evidence is in favour of pathogenicity, but until greater numbers of organisms have been isolated and investigated, the matter must rest *sub judice*.

ACKNOWLEDGMENTS.

I must acknowledge my indebtedness to Colonel D. T. M. Large (late R.A.M.C.), being the first worker to record the presence of undescribed non-mannitol-fermenters from dysentery cases in India.

I have to thank Colonel J. S. K. Boyd, Lieutenant-Colonel C. D. M. Buckley and Lieutenant-Colonel H. Bensted for their helpful advice and encouragement during the investigation and Quarter-Master-Serjeant F. C. Pinion and Private M. B. Ellis, B.Sc., R.A.M.C., and Drs. Chuni Lall and Gopal Chandra, I.M.D., for their untiring help and co-operation throughout the investigation.

My thanks are due also to all officers, R.A.M.C. and I.M.S., who have worked in military laboratories during the last five years and from whom I received strains for investigation.

It is hoped that these findings will stimulate further investigation and enable more data to be accumulated on which to arrive at definite conclusions with regard to the pathogenicity of these new types.

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OBSERVATIONS ON MILITARY SANITATION.

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It is rightly said that the primary object of all hygiene and sanitation is the preservation of health and the prevention of disease and all methods of organization, administration and practice should concentrate on and lead to that objective.

Let us now take one of the most important subjects of sanitation, either in cantonments or in the field, viz. "disposal of waste products."

Sanitarians tell us that the object to aim at in the disposal of waste products is to render them innocuous, which signifies: (1) that pathogenic germs are eliminated and hence the source of infection is reduced, (2) that its nature is so changed that it no longer allows of the breeding of insects, flies, mosquitoes and other disease-carrying and obnoxious pests, and (3) that it causes no offensive vapour or smells either before or during the process of disposal.

Let us now take step by step the methods advocated and in use in a majority of cantonments and in the field, and examine how far they carry out this object.

COMPOSITION OF WASTE PRODUCTS.

Solids.

- (1) Human fæces.
- (2) Stable refuse.
- (3) Slaughter house offal, etc.
- (4) Camp refuse and kitchen garbage.
- (5) Cantonment refuse.
- (6) Carcasses.

Liquids.

- Urine, human and animal.
 Kitchen sullage (grease).
 Ablution sullage (soap).

METHODS FOR THE DISPOSAL OF HUMAN, ANIMAL AND OTHER WASTES AS PRACTISED IN MOST OF THE CANTONMENTS AT PRESENT AND HOW FAR THEY ATTAIN THE OBJECTIVE.

(1) *Human Excreta*.—Most of the cantonments in India still have open pan latrines for Indians either as group latrines or individual ones in buildings of Saddar bazars and others. The contents of the open pans, as is well known, act as bait and, by the time the excreta are removed by the sweepers, many flies have settled on them, laid their eggs there and carried infection from them to food and water consumed by human beings. The harm done so far cannot be eradicated by any amount of trouble and money spent on the further disposal of human excreta. Thus, the most important and primary object of hygiene and sanitation, viz. "prevention of disease" is broken at the very start.

In the sanitary disposal of waste products the object to be aimed at is

"to render the waste products innocuous." The open pan latrine rather than making the excreta innocuous makes them—(1) Act as a source of infection; (2) give out offensive smell and consequently; (3) attract flies who use them as a breeding place and carry disease germs from them to food and drink.

One stage in the disposal of human excreta is their transit from latrines to either the incinerator or the trenching ground. Very little opportunity is offered to flies to settle and lay eggs and carry infection to food and drink during this process.

The final disposal of excreta is either by—(1) incineration or (2) trenching.

The former is gradually being replaced by the latter due to the emanation of acrid odour given out by the burning excreta to those living in the neighbourhood of the incinerator and the increasing difficulty of getting litter for incineration due to recent mechanization of the Army and consequent absence of horses and mules. Though incineration is supposed to be the best form of disposal of human excreta, the way it is carried out in cantonments is far from satisfactory. It is common knowledge that fly breeding goes on near it.

Trenching.—In a very big percentage of cantonments trenching, either by itself or in conjunction with incineration, is the main way in which human excreta are got rid of. Flies will breed out from trenching grounds so long as fly eggs are present in the material trenched and no amount of labour and money spent here can prevent it. This source of fly breeding will continue so long as flies are allowed access to human excretion at its source, i.e. latrines.

In the Field.—Shallow trenches and bored hole latrines should not be used as they will breed flies and infection of food and drink will surely take place, as is the case with open pan latrines.

Deep trench latrines with automatic closing lids are best suited for use in the Field. If properly constructed they will not only prevent infection of food and fly breeding but will also do away with the final disposal of excreta.

On the Line of Communication and at the Base.—Fly-proofing of the latrine pan, and composting, to my mind are the most sanitary ways of dealing with human excreta.

N.B.—Composting is an aerobic biological process.

At the base, if hand removal is the method, the most important step is to have automatic fly-proof latrines in which the pan is fly-proofed. The final disposal should be by composting. The latter is by far the most sanitary way of disposing of all human wastes. It makes the compost mass absolutely innocuous in the shortest possible time. It requires a small area for the final disposal of all wastes. It requires an initial small outlay which is amply repaid by selling the proceeds and in a short time not only works on a "no cost" basis but becomes a source of income.

It requires no more supervision than any other known form of disposal

of all human wastes. It is cheap to work and all wastes are disposed of at the same time and place.

It is not necessary to have the composting at a long distance from the camp or cantonment and if properly managed it should be within the cantonment to save cartage.

Stable Refuse in Cantonments and Stationary Camps.—This is a very profuse breeder of flies. House flies breed in horse and mule litter and rarely in other cattle droppings.

In Cantonment.—Collecting platforms and bins are specially provided for collecting droppings from stables till they are removed, dried on platforms and thence stored for burning in incinerators with night soil.

From the practical point of view leaving a heap of litter exposed to flies on such a platform, so that they may settle and lay their eggs on it, is against the primary principle of good sanitation.

In fact rather than preventing fly breeding it helps it. Does it not seem sound reasoning to keep all fly breeding spots and places from which flies carry infection out of bounds to flies rather than allow them a free entrance to these and, after they have bred and carried infection, to try and destroy them? Could not the large amount of money spent on destruction of flies be profitably utilized on fly proofing these places? I am certain there are a lot of sanitarians who can use their ingenuity in devising such contraptions, the use of which would make all fly breeding spots and places from which infection is carried by them, fly-proof.

For the use of litter an automatic fly-proof box is devised which is cheap to make and sufficient for fly proofing daily litter of 25 animals for a sum of Rs. 10 to 12 at Lucknow. The use of these by a cavalry unit there was effective in stopping fly breeding (a sample could be got from E. O., Lucknow Cantonment). All litter soon after it is evacuated should be put in these boxes so that no flies can get access to it. After a time it should be raked and spread out thinly on any ground exposed to sun. Except in very wet weather the litter dries up within twenty-four to forty-eight hours at the most. Once it is dried it ceases to attract flies and, even if a few maggots have developed in the dried litter, the process of drying having destroyed all pabulum, the maggots would perish from starvation. Once dried the litter could with advantage be either burnt in incinerators or dumped in dry pits and covered up for use as manure later on. This will not breed flies.

Besides exposing litter in collecting pits, (1) dumping fresh litter in pits till they are full for manurial purposes, (2) dumping it round incinerators in fresh condition for use later on for burning purposes, and (3) selling it to contractors, are some of the other common ways in which litter is disposed of in most of the cantonments in India.

In all these it is exposed to flies and breeds them profusely.

In the Field the best way of disposal of litter is by tight packing.

On the lines of communication and base, the use of automatic fly-proof

boxes and drying in thin layers as described above for cantonments brings an income to the unit concerned as well as being the most sanitary way of its disposal.

Slaughter Houses, Offal, Blood, Etc.—To my knowledge, this is a more profuse breeder of flies than animal litter, and one which could be the most easily controlled of all fly breeding places, nor does it require any ingenuity in providing special contraptions. All that is required is to have trenches always ready in the vicinity of slaughtering places. Animals are usually slaughtered after sunset or even later in most cantonments when the flies are resting for the night. All that is therefore required is to see that the offal, etc., are buried and trenches covered up during the night immediately after cleaning and washing of the slaughter houses. As no eggs are laid, no breeding is possible from it. The same could be done at the R.I.A.S.C. Depots in the Field.

In the Field meat is distributed to units on hoof and units do their own slaughtering. Indian Troops do this during the day. I have tried and found the following method very successful: A trench 2 to 3 feet long 1 foot wide and 2 feet deep is kept ready every day. The animals to be slaughtered are put on the edge with the head and neck overhanging this trench and the animals are slaughtered there, the blood thus falling in the trench. A little earth is sprinkled on top of it to prevent flies settling and laying their eggs till the time when skinning and cleaning is completed. After skinning and opening up the body the whole of the alimentary canal is separated and put directly in the trench and the trench covered up. During the process no time or opportunity is given to flies to settle and lay their eggs, hence there is no breeding.

Camp Refuse and Kitchen Garbage.—In cantonments open platforms are specially made for these where all the refuse and garbage is collected and exposed to flies, with the evident result, "profuse fly breeding." I have seen at least one cantonment where rubbish is intimately mixed with all night soil of the Saddar bazar and exposed on such open platforms till it is finally disposed of by shallow trenching on grass farms. A sensible way, easy to achieve and most sanitary, is to provide automatic closing bins for this purpose. It would then make it impossible for flies to lay their eggs on refuse and garbage. All this could then be easily composted.

Borrow pits and such like on the outskirts of some cantonments are filled in by this refuse. Though fly breeding from this source is outside the cantonment, flies are carried to it by cattle which go in and out of the cantonment and by dust storms, etc. Within the last year refuse was employed for filling in a huge pit which was breeding mosquitoes profusely right in a first class District Headquarters office compound with the inevitable result that it was converted into a fly-breeding farm. This had to be stopped immediately by having the whole pit emptied again.

If pits are to be filled in by refuse a very safe way is to keep the top

layer of rubbish smouldering night and day till the whole process is completed and then cover it over with at least a foot of earth. The heat will destroy all eggs and maggots and also keep the flies off the mass.

As regards the methods of disposal of carcasses, urine, kitchen and ablution sullage now in use no observations are offered as they are satisfactory.

THE DIAGNOSIS OF TRAUMATIC HÆMATURIA AND REPORTS OF CASES.

BY MAJOR H. S. SHUCKSMITH, F.R.C.S.,

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TRAUMATIC hæmaturia can present difficult problems in clinical diagnosis. Textbook descriptions of damage to individual components of the urinary system give a multiplicity of signs and symptoms and often an involved classification of the types of damage which may occur, yet out of this wealth of detail it may be difficult to carry a clear picture in mind when confronted with a given case. It is essential to have as simple a classification of traumatic lesions as is consistent with an adequate guide to treatment and to remember the salient clinical features which allow the diagnosis to be established.

The hazards of war present patients with multiple injuries either in multiple bomb splinter wounds or in non-penetrating wounds due to falls of masonry. It cannot be repeated too often that all wounds of the abdomen, buttocks and thighs may involve the bladder and that this viscus is commonly injured in fractures of the pelvis but frequently in cases injured by falls of masonry, even when the pelvis is fractured, the hæmaturia may be the result not of a ruptured bladder but of damage to a kidney.

It is obvious that in operative procedures a well-founded diagnosis is essential when the incision may for example involve exploration from the loin or alternatively laparotomy, but a precise diagnosis is of practical importance also in cases which do not require operation. A ruptured kidney may in months or years become hydronephrotic and its diagnosis at the time of injury may be important for subsequent Medical Boards.

It is not intended to give a recapitulation of the classical descriptions of injuries to individual organs but to present the practical pathological and clinical features which are of paramount importance in diagnosis and treatment.

RUPTURES OF THE PENILE URETHRA.

The classification for practical purposes into complete and incomplete is sufficient. In complete rupture there is blood running from the external urethral meatus, retention of urine, and the central perineal swelling may be relatively large; in incomplete ruptures there is only a spot of blood on the end of the meatus, the patient can pass urine and the perineal swelling is

absent or very small. Clifford Morson considers that much less damage is caused by asking the patient to void urine than by attempting to pass a catheter and this teaching should be followed.

The treatment may be succinctly outlined. The incomplete case should be left alone whilst, for the complete rupture, suprapubic cystotomy should be immediately performed and, if circumstances allow, the rupture repaired with or without the use of a catheter as an internal splint. If evacuation is necessary this repair can be done later.

RUPTURE OF THE PROSTATIC URETHRA.

The precise diagnosis depends upon the development of a distended bladder displaced upwards towards the umbilicus. The vesical sphincter remains tonically contracted and after some hours when the secretion of urine is maintained the bladder distends. There is a pyriform central abdominal swelling, dull on percussion, and commonly dullness to the left iliac fossa, in a patient who cannot pass urine and from whom catheterization withdraws only pure blood.

RUPTURE OF THE BLADDER.

The difficulty in forming a clear picture of the signs in rupture of this organ which may, of course, be extra- or intraperitoneal seems to revolve around the question of whether a ruptured bladder can hold any urine. It would seem most unlikely that more than 1 to 2 ounces of urine can be kept in a ruptured bladder if, indeed, as much as this, and a working rule can be applied that if a patient can hold more than this quantity of urine, blood stained or not, then the viscus is watertight.

Beyond the inability to hold urine, and the small quantity of blood-stained urine which catheterization may produce, there may be very few physical signs for some hours and the general condition of the patient may be well maintained. Later, however, in the case of the extraperitoneal rupture, there is diffuse suprapubic tenderness and swelling and, in the intraperitoneal rupture, generalized abdominal rigidity and other features of peritonism.

RUPTURE OF THE KIDNEY.

Blood-stained urine in quantity greater than 1 to 2 ounces voided by the patient or obtained on catheterization must mean a damaged kidney which may commonly be confirmed by local physical signs around the kidney. Complete rupture of the renal vessels presents the picture of internal hæmorrhage and the diagnosis of the site will depend on local physical signs. Clot retention may complicate the picture in severe ruptures of the kidney but the recognition of clot and the distensibility of the bladder will furnish a guide.

RUPTURE OF THE URETER.

This can only be diagnosed at operation and on the development of fistula.

DIAGNOSIS.

The history of the injury, position of the patient, site and direction of the violence and of wounds are of obvious significance. Penetrating or perforating wounds of any part of the abdomen, back, buttocks or thigh demand investigation of the urinary track. The presence of bruising over the loin, symphysis, or in the central or lateral clefts of the perineum, and blood at the end of the external urinary meatus, will be checked. Signs of a fractured pelvis may be elicited and particularly helpful in this connexion is tenderness along the inferior ischio-pubic ramus.

The patient may be unable to pass urine not only on account of mechanical reasons but also from the presence of shock or spasm from local painful wounds. Catheterization is therefore carried out in all cases which cannot micturate except where blood is streaming from the urethra.

The essential features in the differential diagnosis may be outlined as follows:—

(1) Profuse urethral bleeding: complete rupture of the urethra which is confirmed by retention of urine and central perineal swelling and tenderness. Catheterization is not tried as it is detrimental to the local lesion.

(2) Patient can void urine: (a) incomplete rupture of the urethra is established by the presence of a spot of blood on the external urethral meatus; (b) blood-stained urine in quantities greater than 1 to 2 ounces means a ruptured kidney.

(3) Retention of urine, no urethral bleeding, and catheterization reveals blood only: (a) ruptured prostatic urethra is shown by a pyriform suprapubic swelling which is dull on percussion and the dullness may extend to the left iliac fossa; (b) intraperitoneal rupture of the bladder results in abdominal rigidity after the establishment of peritonism which on occasions takes some hours to develop; (c) extraperitoneal rupture of the bladder shows suprapubic tenderness and swelling after some hours; the general condition is good.

CASE REPORTS.

(1) *Simple Rupture of the Kidney: Fractured Pelvis.*

A Lieutenant-Colonel aged 44 was pinioned in a doorway by falling masonry for four hours. He was admitted showing little measurable indices of shock, the pulse being 95 and the systolic blood-pressure 135 mm. of mercury. There was tenderness over the left inferior ischio-pubic ramus due to a fracture of the lower margin of the obturator foramen revealed on radiography. He passed 10 ounces of blood-stained urine which was considered to have arisen from a partial rupture of the right kidney as there was a large abrasion over this region caused by a block of stone. The urine was free of blood in thirty-six hours.

This diagnosis of ruptured kidney may well be of importance later should hydronephrosis develop in this kidney. It was not considered that the information to be gained on intravenous pyelography justified the use of materials to assess the degree of damage to the kidney.

(2) *Simple Rupture of the Kidney: Fractured Pelvis.*

A Javanese Merchant Seaman aged 30 suffered extensive bruising over the left flank and hip when his ship was torpedoed. He had hæmaturia which lasted for four days and a fracture of the ischio-pubic component of the left obturator foramen. There was evidence of a left perinephric hæmatoma. His convalescence was uninterrupted after aspiration of a large subcutaneous hæmatoma in the left flank.

(3) *Bomb Splinter Wound Kidney. Penetrating Wound of Chest.*

A Bombardier R.M.A. aged 19 sustained a B.S.W. over the right upper part of the loin. His general condition was good, pulse 100, systolic B.P. 125 mm. of mercury. There was a small entrance wound over the lower ribs 4 inches from the spine. The abdomen was slightly resistant and the urine contained blood. The apex beat was displaced 1 inch to the left of the middle line, there was no dullness on percussion of the chest and air entry was good. An X-ray showed a metallic foreign body in the region of the 10th right dorsal transverse process.

Transfusion was started, the entrance wound excised and the right kidney explored: extensive bleeding from the upper pole could not be controlled by sutures over fascia so nephrectomy was done, the peritoneum was opened and the abdominal cavity explored with negative findings. The track of the wound was through the diaphragm into the chest. The hole in the diaphragm was closed by a couple of sutures around the adjacent rib. The wound was closed with rubber drainage. A thoracotomy was performed by resection of 3 inches of the 7th rib in the mid-axillary line and a little blood mopped out. The chest wall was closed with valve drainage.

The post-operative course was extremely severe. The respirations were 50 per minute for several days.

X-ray examination revealed extensive collapse of the left lower lobe of the lung and patchy pneumonia of the whole of the right lobes which were fully expanded. The drainage tube was removed. Oxygen through a B.L.B. mask gave remarkable benefit to the patient.

Looking back on this case the thoracotomy was rank interference and nothing else.

He gradually recovered although after two months the collapsed lobe had not fully expanded. It was debated whether he should be boarded for discharge from the Army but somehow he managed to settle that himself. Instead of appearing for re-examination inquiries elicited that he had returned to his gun.

(4) *G.S.W. Thigh: Penetrating Wound of Bladder.*

A Dutch boy aged 15 had been machine gunned from the air thirty-six hours previous to admission to hospital. His general condition was good, there was an entrance wound in the right Scarpa's triangle, he could not pass urine and showed suprapubic tenderness and slight swelling. Suprapubic cystotomy was performed, pieces of metal removed from the bladder and the entrance wound in the thigh enlarged. He had to be evacuated to a local hospital a few hours after the operation.

(5) *Rupture of the Prostatic Urethra: Extra- and Intraperitoneal Rupture of the Bladder, Fracture Dislocation of the Pelvis.*

R.A.F. Corporal aged 21 was buried by falling masonry. He was admitted within the hour, his general condition was good, the pulse being

80 and systolic B.P. 135 mm. of mercury. The abdomen was rigid, lateral pressure on the pelvis elicited free movement and catheterization revealed pure blood. 1,000 c.c. of Stored Group IV blood were given and laparotomy performed. The intestines were undamaged, there was an intraperitoneal rupture of the fundus of the bladder which was sutured from the peritoneal aspect and the peritoneum closed; an extraperitoneal rupture near the left ureteric orifice was sutured with non-chromic catgut from inside the bladder and the dislocated prostatic urethra was rail-roaded on a catheter and the surfaces of the ruptured urethra apposed. The lateral vesical space was drained and a large tube left in the bladder and the catheter splint was anchored to the suprapubic wound.

The urethral catheter was left in site for ten days and then removed. He passed urine on the fourteenth day and the bladder healed within a month. The treatment of the fracture dislocation of the pelvis necessitated eight weeks' recumbency, basal pneumonia complicated convalescence and the urine was heavily infected with *B. coli* and contained pus. Constant efforts to maintain an adequate fluid intake, to produce an acid urine and to sterilize the urine, failed. Multiple recumbency calculi developed which had to be removed at two operations. A right pyelolithotomy and suprapubic lithotomy were withstood and fourteen days later left pyelolithotomy was performed. A further stone was present in the left side at the region of the pelvic brim and as the kidney showed some evidence of hydronephrosis a nephrostomy was performed. This wound soon healed and he was well enough to be repatriated.

SUMMARY.

The diagnosis of traumatic hæmaturia is discussed in an attempt to present a simple system for diagnosis.

Cases of rupture of the kidney, simple and compound, ruptures of the bladder and prostatic urethra are described.

My thanks are due to Colonel F. Whalley, *D.S.O., T.D., K.H.P.*, who commanded the hospital in which the patients were treated, and to Colonel A. S. Heale, *M.C., D.D.M.S.* of the Command abroad, for permission to submit this article for publication.

ADAPTING THE FIELD BOYLE'S ANÆSTHETIC APPARATUS FOR CARBON DIOXIDE ABSORPTION.

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THERE are many advantages that may be claimed for the principle of carbon dioxide absorption during anæsthesia, such as economy of anæsthetic gases, prevention of heat and water vapour loss from the patient and quiet respirations during anæsthesia. In wartime, when the value of shipping space has to be measured, not in terms of money but of men's lives and available tonnage, the question of economy is pre-eminent.

If the apparatus, Boyle, Field Service pattern, be used with the normal

semi-closed technique a hundred gallon cylinder of nitrous oxide will give about one and a quarter hours anæsthesia. If the carbon dioxide absorber that is about to be described is used a hundred gallons will last at least ten hours, representing a saving of 800 per cent. The saving of oxygen and ether is proportional. Gas cylinders are bulky and difficult to transport, empty cylinders have to be returned and if this saving is considered in relation to the requirements of a number of general hospitals and C.C.S.s it will be seen that it represents a very real economy.

In evolving this apparatus two factors were kept in mind. The apparatus must involve no structural alteration to the existing apparatus so that the machine is readily available for either the semi-closed or the absorption techniques. The design must be such that its construction can be effected with the tools supplied to the sappers attached to a general hospital.

There are two types of absorber, the to-and-fro type that was designed by Waters, in which the absorption canister is close to the patient, and the circle type with the canister remote from the patient that was developed by Sword. The Waters' type is the simpler and lends itself more to improvised construction and is the type that is described.

The canister is made from a tin 6 by 3½ inches. To the inside of the lid is soldered a cigarette tin lid pierced with holes to form a baffle to retain the soda lime. The bottom of the tin has a hole cut in it and a piece of 1 inch tubing soldered into it. This tube projects almost the whole length of the tin and is pierced with holes. This ensures that a large surface of soda lime is in contact with the exhaled gases and that resistance to breathing is reduced to a minimum. To the length of tubing that projects outside the tin is fixed a rebreathing bag from a nitrous oxide apparatus. This bag has a small opening at the opposite end of the bag and through this are led the fresh gases from the machine. Into the lid of the canister is soldered the three-way valve from a nitrous oxide apparatus and this will fit either into an anæsthetic mask or an endotracheal connexion.

The carbon dioxide absorption technique demands an oxygen flow of between 200 and 400 c.c. a minute to meet the patient's basal requirements. The "bubble bottle" of the Field Boyle will not measure such a small flow. A flowmeter was therefore devised. This works on the water depression principle. A bottle fitted with a long and a short glass tube is filled four-fifths with water and strapped to the "bubble bottle" as shown in the illustration. The long tube is connected to a T-piece. To one arm of the T is led the oxygen from the cylinder and the other is attached to a 14 gauge needle which is pushed through a cork and fixed into the filler of the "bubble bottle" in place of the usual cork. The short tube is connected to the normal oxygen inlet on the top of the "bubble bottle."

Flows of between 100 c.c. and 1,000 c.c. a minute are read by the amount that the column of water in the long tube is depressed while the oxygen passes into the machine through the needle. If a litre or more of oxygen per minute is required it bubbles through the depression tube and through

the bubble bottle in the ordinary way. The flowmeter was calibrated by means of a measuring cylinder and a stop watch. The cylinder was filled with water and inverted over a basin of water. Oxygen was bubbled into

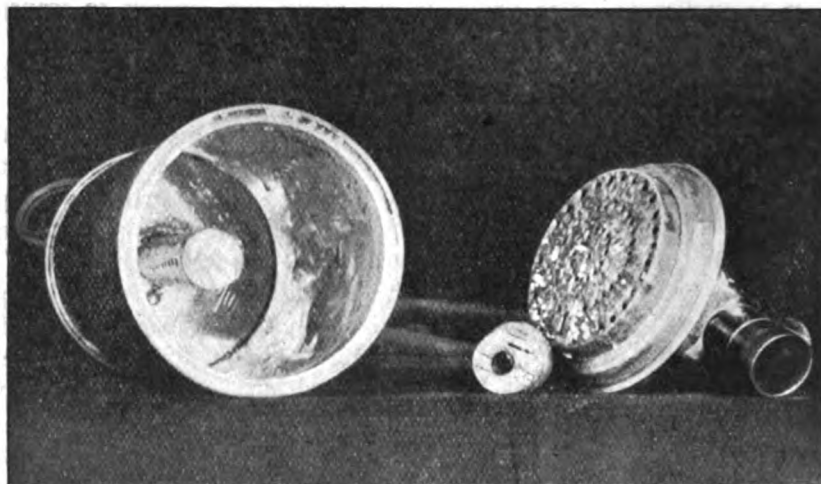


FIG. 1.—Showing canister open and arrangement of baffles.

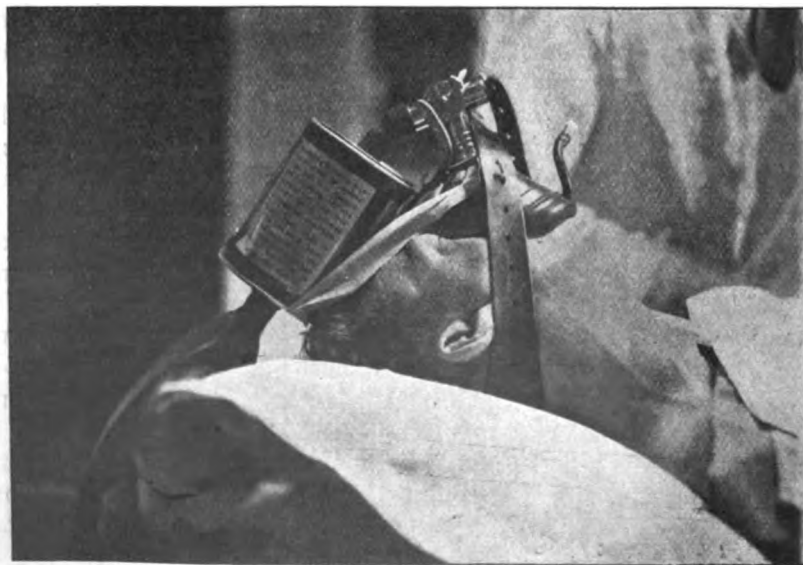


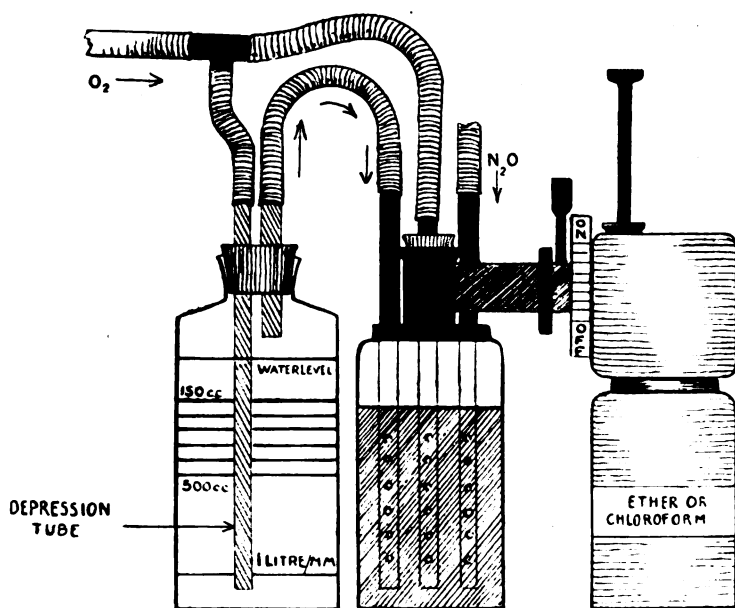
FIG. 2.—Absorber in use. (This is the first absorber that was made.)

the cylinder and from the amount of water displaced in a given time the rate of flow for various degrees of depression of the column was easily

calculated. This was recorded on a cardboard scale and strapped to the back of the flowmeter.

If the apparatus is required for use with the semi-closed technique it is merely necessary to connect the oxygen tube to the bubble bottle in the normal position and replace the cork with the needle through it by the proper cork and the apparatus functions in the ordinary manner.

When using the absorption technique the patient is induced with the semi-closed technique and when the required plane of the third stage is reached the absorber is fitted, the flow of nitrous oxide is cut off and the oxygen flow reduced to about 350 c.c. according to the amount required to



Drawn by Captain Waugh, R.A.M.C.

FIG. 3.—Showing the connexions to the Field Boyle. (The tube bringing CO_2 to the connexion on top of the bubble bottle is hidden by the tube bringing O_2 to the needle.)

keep the bag just full. During the first fifteen minutes the bag is emptied two or three times in order to get rid of the nitrogen from the circuit but after that time it is merely necessary to add a little nitrous oxide from time to time to replace leakages.

It will be obvious that I am indebted to Dr. Pask for the idea of using a needle to provide the necessary resistance in a water depression flowmeter.

My thanks are also due to Sapper Hicks, the R.E. attached to this General Hospital. He has constructed and modified two canisters and has shown a ready appreciation of the problems involved in their construction.

Current Literature.

KISIDA, S. **Salt Effects upon the Antigenic Components of V-Form *B. typhosus*, especially on the Action of Calcium Chloride.** *Kitasato Arch. Exper. Med.*, 1941, Feb., v. 18, No. 1, 1-12. [13 refs.]

A Vi-strain of *Bact. typhosum* (Ty2) when grown on agar containing a certain concentration of one or other of a range of neutral salts lost its Vi-agglutinability, its virulence and its power to fix complement in the presence of a Vi antiserum. CaCl_2 proved an exception in that the inclusion of an amount not inhibitory to growth brought about loss of Vi-agglutinability and a decrease in virulence while complement-fixing ability and immunizing value for mice were retained.

Washed organisms from ordinary agar were suspended in salt solutions for twenty days. Whereas in NaCl the Vi-antigen is liberated into the solution, in CaCl_2 it is said to be retained on the bacterial bodies. A suspension of the latter, containing no living organisms, produced Vi antibodies on injection into rabbits and active immunity in mice against the Ty2 strain. It is suggested that organisms thus treated would make a suitable vaccine for human use.

J. C. CRICKSHANK.

Reprinted from "Bulletin of Hygiene," Vol. 16, No. 9

Reviews.

TEXTBOOK OF MEDICINE. By J. J. Conybeare, M.C., D.M.Oxon., F.R.C.P. Sixth Edition. Edinburgh: E. and S. Livingstone. 1942. Pp. xx + 1147. Price 28s. net.

In spite of the increase of specialization the average R.A.M.C. officer may be called upon to act as Dermatologist, Venereologist, Psychiatrist or Neurologist, and even Pediatrician, as well as General Physician. In the one easily portable volume of this popular textbook of medicine he will find the necessary up to date information.

The various contributors have obviously written from wide personal experience but for brevity have sometimes stated their own views somewhat dogmatically.

In the preface it is emphasized that the section on Tropical Medicine should not be regarded as a substitute for a textbook on that subject and few would agree with the statement that drugs, other than quinine, used in the treatment of malaria are too toxic for general use as prophylactics or

that drugs of the sulphonamide group have yet to prove their value in severe Shiga dysentery.

The dosage of sulphapyridine, 1 g. t.i.d. for seven days to an ambulant patient, is not considered to be so efficacious as the larger and more concentrated dosage recommended in Army clinics. The toxic reactions of the sulphonamide group are enumerated with their significance, prevention and treatment, but anuria is not mentioned as a sequel of hæmaturia. The use of intravenous T.A.B. in the treatment of lymphogranuloma inguinale is worth mentioning.

The introductions to each section, such as the symptomatology of nervous diseases, renal functions, and the symptoms encountered in mental diseases, are excellent, place the subsequent section on a scientific basis and are easy to read.

More space might have been devoted to the treatment of such a common condition as seborrhœa and its complications.

There are few who could fail to be interested in this book or to find something new in its pages which are a little over 1,000 in number.

W. R. C. S.

Correspondence.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—With reference to the article entitled "A Factor Inhibiting the Agglutination of *Bact. alkalescens* by homologous serum" (this Journal, September, 1942), it may be of interest to place on record that I have recently isolated a strain of *Bact. alkalescens* exhibiting this inhibitory factor in Madagascar from the fæces of a Naval officer suffering from chronic diarrhœa.

The chief interest concerning this organism, of course, lies in its liability to be confused with *B. dysenteriae* Flexner—a liability obviously increased by failure to agglutinate in the presence of alkalescens serum.

I am, etc.,

Madagascar,
October 3, 1942.

G. T. L. ARCHER,
Major, R.A.M.C.

Notice.

MEDICAL SUPPLIES FOR RUSSIA AND CHINA.

It is announced that medical supplies to the value of £2,500 have been presented by The Wellcome Foundation to Mrs. Churchill's Aid to Russia Fund and a similar amount to Lady Cripps' United Aid to China Fund. Arrangements have been made for these medical supplies to be despatched to Russia and to China at an early date.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in duplicate through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps, and articles of a non-scientific character, may be accepted for publication under a nom-de-plume.

All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps," will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

A free issue of twenty-five reprints, or any lesser number to the extent applied for, will be made to contributors of Original Communications and of twenty-five excerpts, or any lesser number as above, in the case of Lectures, Travels, Clinical and other Notes, and Echoes of the Past. Such free reprints or excerpts will, however, only be sent to those specifying their wish to have them and a request for same should accompany the article when submitted for publication, stating the number of reprints or excerpts required.

Reprints or excerpts, additional to the above, can be furnished on payment if specially ordered at the time of submission of the article for publication.

Except as in the first paragraph above, communications in regard to editorial business should be addressed—"The Editor, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, A.M.D.5, War Office, Whitehall, S.W."

MANAGER'S NOTICES.

The Annual Subscription for the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is £1 payable in advance. Single copies, 2s. 6d. per copy.

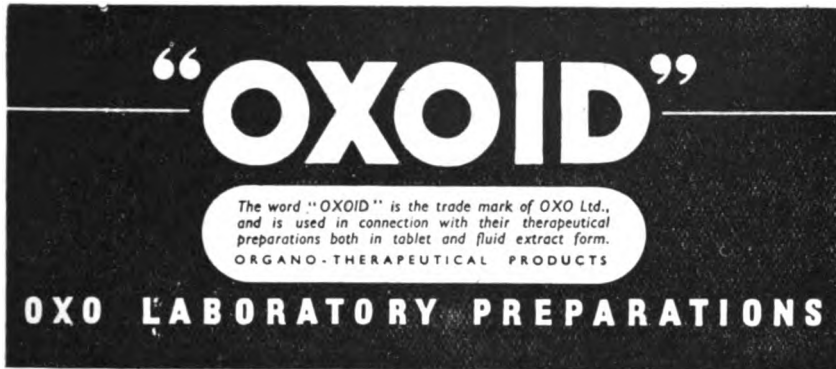
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JOURNAL

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ROYAL ARMY MEDICAL CORPS

Corps News.

FEBRUARY, 1943.

EXTRACTS FROM THE "LONDON GAZETTE."

February 11, 1943.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North Africa:—

The Military Cross.

Capt. Michael Henry Knox Haggie, M.B. (205598), Royal Army Medical Corps (Stamfordham, Northumberland).
Lt. Charles Granville Rob, M.B., F.R.C.S. (230698), Royal Army Medical Corps (Northwood).

January 29.—Lt.-Col. E. E. Holden (15673), having attained the age for retirement, January 28, 1943, is retained on the active list (Supern. to estab.).

February 5.—Undermentioned Majors to be Lt.-Cols.:—

Major (temp. Lt.-Col.) R. N. Phease, M.B. (1356), November 8, 1942.

Major (temp. Col.) C. B. C. Anderson, O.B.E., M.B., F.R.C.S. Edin. (5755), December 19, 1942.

Major (temp. Lt.-Col.) P. E. D. Pank (5427), December 21, 1942.

Major (temp. Lt.-Col.) G. Moulson, F.R.C.S. Edin. (15376), January 23, 1943.

Major (temp. Lt.-Col.) G. B. Wild (15758), January 28, 1943.

Major (temp. Col.) R. D. Cameron, M.C., M.B. (8711), February 7, 1943.

Undermentioned Capt. to be Major, January 24, 1943:—

Major (temp.) M. S. W. Bisdee (58237).
F. King, M.B. (58545).

February 9.—Lt.-Col. (temp. Col.) G. B. Hadden, M.B. (10416), having attained the age for retirement is retained on the Active List (supern. to estab.). February 7, 1943.

TERRITORIAL ARMY.

February 5.—General List.—War Subs. Capt. A. G. W. Whitfield, M.B. (57326), relinquishes his comm. on account of ill-health February 4, 1943, and is granted the hon. rank of Major.

Capt. P. F. Delaney (93839) relinquishes his comm. on account of ill-health

February 17, 1943, and is granted the hon. rank of Major.

February 9.—Lt.-Col. (temp. Col.) (local Brig.) F. A. E. Crew, T.D., M.D., D.Sc., Ph.D., F.R.C.P., F.R.S., R.A.M.C. (25906), relinquishes the local rank of Brig., December 30, 1942.

THE ARMY DENTAL CORPS.

February 5.—Capt. H. C. Dobbie (58239) to be Major, February 1, 1943.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

February 9.—Sister Mrs. M. Proctor (née Ward) 208022 resigns her appt., April 28, 1942.

ROYAL ARMY MEDICAL CORPS COMFORTS GUILD.

The Committee of the Royal Army Medical Corps Comforts Guild are very grateful to all ranks of the R.A.M.C. at Home and Overseas who have so generously contributed to the Fund.

Arrangements have been made to adopt all R.A.M.C. prisoners of war who have no "Next of Kin," or who's relatives are unable to contribute to their quarterly personal parcels. Particulars are received through the British Red Cross Society, Prisoners of War Department.

The following donations have been received within the past three months.

- £50 from the Staff of the Military Hospital, Barming Heath.
- £50 from No. 10 Company, R.A.M.C.
- £50 from No. 1 Depot, R.A.M.C.
- £20 from Headquarters, Eastern Command (R.A.M.C. other ranks).
- £24 from the Staff and Personnel of the Military Hospital, York.
- £15 10s. from the Camp Reception Station, Church Stretton.
- £9 13s. 5d. from 19 C.C.S.
- £25 from 102 General Hospital.

- £10 1s. 11d. from O.C. and Staff, The Military Hospital, Llandilo.
- £8 13s. 9d. from P.R.I., Military Hospital, Moston Hall.
- £5 5s. 0d. from Staff of 172 Field Ambulance.
- £7 12s. 0d. from Officers of the Military Hospital, Shaftesbury.
- £8 9s. 6d. from R.A.M.C. Officers, Headquarters, India.
- £64 from Headquarters, Northern Command.
- £27 16s. 3d. from Staff, Military Hospital, Newport, Mon.
- £4 3s. 6d. from Personnel 211 Field Ambulance.
- £3 from O.C. 83 General Hospital.
- £10 from the Officers and Staff, Medical Directorate, War Office (per Major Bull).
- £5 10s. from A.M.D.2 (Stats.), War Office (per Lt. Tippet).

*R.A.M.C. Headquarters Mess,
Millbank,
London, S.W.1.*

PRISONERS OF WAR AND MISSING.

Prisoners of War.

- T./Col. Wardle, V. H., Malaya.
- Capt. Simmonds, G. H. A., N. Africa.
- Capt. Smiley, T. B., Malaya.
- Capt. Wallace, R. B., Malaya.
- Lt. Gordon, A., N. Africa.
- Lt. McGavin, J. G., N. Africa.

Missing.

- T./Major Clarke, R.
- Lt. Drysdale, A. D.

- Lt. Gimpelson, H.
- Lt. Harris, K.
- Lt. Highet, W. B.
- Lt. Jolly, N.
- Capt. Kelly, T. A.
- Capt. Needham, E. J. A.
- Capt. Perkins, J. A.
- Lt. Warren, J. G.
- Capt. Proven, R.
- Major Officer, J. M.
- Lt. Gavurin, H.

DEATHS.

WOOD.—In Rosslyn Castle, Midlothian, on Jan. 4, 1943, Lt.-Col. John Lawrence Wood, *O.B.E.*, R.A.M.C., retired. Born Feb. 23, 1881, he was educated at Cambridge and St. Thomas's Hospital. He took the B.A. Cantab., in 1902, and the M.R.C.S., Eng., and the L.R.C.P.Lond., in 1906. Commissioned Lieutenant Jan. 28, 1907, he was promoted Captain July 28, 1910, Major Jan. 28, 1919, and retired with the rank of Lieut.-Colonel Jan. 28, 1927. He was re-employed from then till 1940. He served in France from Aug. 19, 1914, till the July, 1919. Thrice mentioned in despatches he was awarded the *O.B.E.*, created Chevalier of the Military Order of Avis and received the 1914 Star, British War and Victory Medals.

ELDERTON.—In Ryde, Isle of Wight, on Jan. 28, 1943, Major Frederick Dundas Elderton, R.A.M.C., retired. Born Sept. 2, 1861, he took the L.R.C.S.I. and the L.R.C.P.I. in 1881. Commissioned as Surgeon afterwards Surgeon Captain May 30, 1885, he was promoted Surgeon Major afterwards Major, R.A.M.C., May 30, 1897, and retired May 30, 1905. He was re-employed Aug. 5, 1914, till July 10, 1915, and again at Reading from July 10, 1916, till May 13, 1918. He served in Burma 1886-1887 being awarded the Medal with Clasp. He took part in the South African Campaign 1899-1902 in the operations in Cape Colony and the Orange River Colony receiving the Queen's Medal with two Clasps and the King's Medal with two Clasps.

SYLVESTER-BRADLEY.—In Weymouth on Feb. 3, 1943, Lt.-Col. Charles Reginold Sylvester-Bradley. Born Sept. 9, 1878, he took the L.R.C.P. London and M.R.C.S. England in 1902 and was commissioned Lieutenant, R.A.M.C., Aug. 31, 1903. He was promoted Captain Feb. 28, 1907, Major Feb. 28, 1915, Brevet Lieutenant-Colonel Jan. 1, 1917, Lieutenant-Colonel June 1, 1926, and retired Aug. 12, 1927. He was Divisional Adjutant School of Instruction 43 (Wessex) Division T.A. 1911 till 1916 and after the Great War Medical Inspector of Recruits, Eastern Command. He served on the North West Frontier of India in 1908 receiving the Medal with Clasp. In 1917 and 1918 he served with the Egyptian Expeditionary Force. Brought to notice for valuable services he received the Brevet of Lieutenant-Colonel, the British War and Victory Medals.

BUIST.—In Brighton on Feb. 5, 1943, Major John Martin Buist, M.B., R.A.M.C., retired. Son of the late Dr. A. Buist, he was born in Perth, May 29, 1872, and graduated M.B. Edin., in 1893 and took the D.P.H. and D.T.M. & H. Cambridge in 1904. He joined the Army as Surgeon Lieutenant July 28, 1894, and was promoted Surgeon Captain July 28, 1897. He was seconded for service with the South African Constabulary Aug. 2, 1902, till Nov. 30, 1903, and was promoted Major R.A.M.C. Jan. 29, 1906. He was placed on half pay on account of ill-health June 4, 1909, till Feb., 1910, and again from Feb. 6, 1915, till he retired Feb. 6, 1920.

ANDERSON.—In London On Feb. 7, 1943, Col. John Buckle Anderson, late R.A.M.C., retired. Born in King William's Town, British Kaffraria, Cape Colony, Oct. 13, 1866, he took the L.R.C.P. Lond., and the M.R.C.S. England, in 1892. Entering the Army July 29, 1893, as Surgeon Lieutenant, he was promoted Surgeon Captain July 29, 1896, Major R.A.M.C. Jan. 30, 1905, Lieutenant-Colonel Mar. 1, 1915, and Colonel Oct. 10, 1918. He retired Oct. 10, 1922, on account of ill-health contracted on service. He served in France from Oct. 29, 1918, till Mar. 11, 1919, and was A.D.M.S. 4 Division Feb. 16 to Mar. 8, 1919. Brought to notice for valuable services rendered he was awarded the British War and Victory Medals.

Missing Presumed Killed in Action

BURTON.—In Malava, Feb. 14, 1942. Lt.-Col. Charles Frank Burton, M.C., R.A.M.C. Born Jan. 16, 1889; he was educated at the London Hospital and took the M.R.C.S. England, and the L.R.C.P. Lond., in 1913. He was commissioned Lieutenant, R.A.M.C.S.R., Sept. 19, 1914, and promoted Captain April 7, 1915, taking a regular commission April 1, 1919. He was promoted Major Sept. 19, 1926, Brevet Lieutenant-Colonel Jan. 1, 1938, and Lieutenant-Colonel May 1, 1938. He served in France from Oct., 1914, till the end of the war. He was awarded the M.C. for conspicuous gallantry and devotion to duty in his skilful handling of the stretcher bearers on all occasions. He always had shown great coolness under heavy fire. He also received the 1914 Star, British War and Victory Medals.



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No. 3

March, 1943.

Vol. LXXX.



Journal

THE

Royal Army Medical Corps

ISSUED



MONTHLY

EDITOR.

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ASSISTANT EDITOR.

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MANAGER.

LIEUTENANT-COLONEL C. A. WHITFIELD, R.A.M.C.

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Journal of the Royal Army Medical Corps.

Original Communications.

REHABILITATION.

By LIEUTENANT-COLONEL STANLEY D. LARGE, *D.S.O., M.C.*,
Officer Commanding Convalescent Depot.

PART I.—REHABILITATION IN GENERAL.

“REHABILITATION” may be defined as—restoration to a state of robust health after injury or illness. It thus connotes the restoration of free movement to stiffened limbs, of vigour to tired minds, of courage and confidence to quailing spirits: in short—the physical, mental and ethical toning-up of the whole individual being. Obviously necessary physically for most persons before resuming work after even a week in bed, it is less obviously—but perhaps more urgently—necessary psychologically. The former need has long been recognized, the latter has for too long been neglected and hence its history is brief.

Rehabilitation as now understood was first officially adopted, during the last war, by provision at our bases in France of special “Fracture Wards” in military hospitals and of “Convalescent Depots” accommodating 5,000 cases each. But this latter innovation did not survive the war: most civil general hospitals continued to discharge their patients, save for a few orthopædic cases, at the earliest possible moment—with no other rehabilitation than occasionally a brief period in a convalescent home devoid of personnel trained to supervise treatment and recovery. That this policy was dictated by urgent need for economy in voluntary hospitals makes it no less disastrous. In 1935 dawning appreciation of the importance of this subject was shown by the British Medical Association’s committee on fractures recommending rehabilitation centres for orthopædic and accident

cases. In 1937 a great advance was made when a joint committee of the British Medical Association and Trade Union Congress submitted a most valuable, detailed memorandum to the "Interdepartmental Committee on the Rehabilitation of Persons Injured by Accidents." But the title of this committee shows how restricted—even so recently—were views on the utility of rehabilitation: it was apparently deemed unnecessary for medical patients and applicable to only a small section of surgical cases. In 1939 the present war revived many needs and measures of two decades before. The urgent need for man-power made it necessary to salvage human waste—which would have been a simpler problem had the organization for that purpose been continued and developed after the last war. It has always needed the spur of catastrophe—by pestilence or war—to force our chief advances in hygiene. Our first Public Health Act was passed, less than a century ago, only under stress of devastating epidemics of cholera. The fighting services introduced anti-typhoid inoculation during the Boer War and perfected the mass chlorination of water-supplies just before the outbreak of the "Great War." History repeats itself as—under the spur of our vital need to conserve man-power in the present war—the fighting services have been again forced to take the lead by establishing rehabilitation centres on the grand scale. One such with 1,000 beds can rehabilitate 10,000 men per annum and send the overwhelming majority of them back to their units fighting fit. It is therefore not surprising that, in 1941, an Army Committee unanimously reported that "There is urgent need for the rehabilitation treatment" and that "Such treatment is desirable for every patient." It is to be hoped that those dicta will not be forgotten in the future when we once again revert to civil national life.

The objectives for the civilian future are inherent in the military present and in the etymology of "Rehabilitation" (Fr. *habiller*, to fit out). A recent novel but very appropriate use of this word in an article on warships suggests admirably the dual purpose as—restoration to fighting fitness for the battle of life. That object will be obviously secured the better, as well as earlier, in proportion as it is achieved by the personal efforts of the individual himself rather than by the assistance of anyone else. But a certain stage must be reached before the individual attains the strength and energy for any advance although—once started—he should progress under his own steam at an accelerating speed which only needs encouragement and direction to take him to his goal. The ultimate aim of preventing all preventable wastage from injury and sickness—of reducing to the minimum all utterly useless idle lives—involves provision of the necessary facilities for rehabilitation and the training of skilled rehabilitators. But earlier still must come means for ensuring in the patient the wish and will to be fit and education to that end in future is also amongst our objectives of the present.

Before discussing the stages into which rehabilitation may be conveniently divided it is desirable to consider the line of demarcation between the hospital stage, of acute injury or illness, and that when the sequelæ

may better be dealt with elsewhere. While obviously no precise line can be fixed a useful practical suggestion is that the transfer should be made as soon as possible after reparative physical processes replace rest, drugs and nursing as the best aids to recovery, i.e. when "go-ahead" replaces "go-easy" as the order of each day for those who are up and need no further daily care by doctor or nurse. While there may persist some doubts—only soluble by extended experience—as to the extent to which convalescent homes are desirable as stepping-stones between hospitals and convalescent depots, there is little dubiety regarding the adverse psychological effect on patients of a hospital environment surcharged with the demoralizing influence of aggregated sick and sorry.

So deleterious is this influence to morale that no soldier should be exposed to it for a day longer than necessary, and the policy of Military Hospitals is to evacuate patients at the earliest possible moment to auxiliary hospitals or convalescent depots—making exceptions, however, of orthopædic cases needing continued hospital treatment. None the less, rehabilitation may be most usefully commenced while patients are still in hospital and still in bed.

Stage 1.—The Hospital—for Patients Initially Confined to Bed.—Rehabilitation while in hospital, desirable in all cases, is essential for those with long-term injuries when fit for it. It is estimated that by this means the average period of incapacity might be reduced by one-third. In the wards at fixed hours daily, purposeful exercises are organized in order to maintain or restore the function of injured parts—especially limbs and joints—and the tone of all somatic muscles, by promoting their use and stimulating circulation. Such exercises should be progressive and may well be combined with physiotherapy and massage given by a fully-qualified masseur under medical supervision. Grouping of similar or allied disabilities provides the most valuable spur of competition in the race for recovery and a musical accompaniment may serve to cheer the depressed along the upward road. Their progress is aided by constructive—but mostly diversional—occupational training, such as weaving, rug-making, wood-work, basket-making, etc., under instruction by a visiting woman handicraft-expert. Orthopædic cases call for special consideration and a considerable range of practice exists in the provision made by various hospitals to meet their essential needs. The simplest is fortification of the normal hospital staff by addition of a fully-trained masseur and physiotherapist. All Emergency Medical Service Hospitals and Military Hospitals with an orthopædic unit have attached one or more trained instructors—generally from the Army Physical Training Corps—while most E.M.S. Hospitals with a fracture unit also now have a physical training instructor. Some E.M.S. hospitals, indeed, have as many as four or even six A.P.T.C. instructors and are doing an immense amount of invaluable work, the remarkable results obtained in such cases as head injury and chest surgery by special active exercise being most impressive.

It is interesting to note that one E.M.S. Hospital near London has adopted a system of grading its patients and sending to the Convalescent Depot with each patient a note of the grade of physical training which he has attained. Patients allowed up may be given such light purposeful work as carpentry and gardening which, by affording proof of progress and promise of complete restoration to independence, provide a valuable psychological stimulus. They should be assembled and trained in the hardy environment of the gymnasium which most E.M.S. hospitals now find essential—with its stimulating suggestion of good progress and better prospects—but, in the interest of these cases, it is better to transfer them, for “hardening,” to a convalescent depot if one be available.

Stage 2.—The Half-way House—for Ambulants.—Accommodation is required—less expensive than the hospital bed—for cases which no longer need treatment and nursing but are not far enough on the road to recovery to stand, without some preliminary “hardening,” the vigorous activity of a convalescent depot. They should not need more than three weeks’ preliminary hardening and should be so far advanced as to be able to do all their own light fatigues. Psychologically as well as physically they are better out of the hospital atmosphere when they cease to be patients and become convalescents.

The Auxiliary Hospitals (British Red Cross Society and Order of St. John) receive ambulant cases from Military and E.M.S. Hospitals. They are visited by civilian medical practitioners and staffed by V.A.D. personnel. Those with 50 beds—30 of which are occupied—have a resident A.P.T. Corps instructor to organize physical training and games. In my opinion, large Auxiliary Hospitals should have as Commanding Officer a resident officer trained in rehabilitation with a reliable N.C.O. to maintain discipline and organize drills, route marches, etc., in conjunction with the A.P.T. Corps instructor. In addition to the basal, daily physical training, all cases should be employed on carefully graduated occupations—more of the nature of recreation than tasks and suitably adapted to their progress—such as carpentry, gardening, wood-cutting, etc. The diversional exercises should also be graduated by such a sequence as billiards, bowls, table-tennis, badminton, swimming, cycling, football. In either case the course should include swimming and work in the gymnasium and lead up, via organized daily walks, to progressive route marches—all under effective expert supervision. The more open air the better but both swimming-bath and gymnasium are essentials for use in wet weather. One class of case is especially suitable. It is the fracture which has united and from which the support has just been removed leaving a stiff, weak, painful joint, exercise of which is inhibited by—apprehension of re-fracture, dissent from the doctor’s view that exercise is essential and fear of losing compensation (if a workman). Such cases do wonderfully well in cheery groups of like exercises. When he no longer needs nursing or treatment, but is still not quite fit for a convalescent depot, he may—with economy—be transferred to a pre-hardening centre.

The Pre-hardening Centre would also be useful, if no Auxiliary Hospital be available, for the accommodation of minor cases not needing hospitalization. It should have as little of the hospital atmosphere as possible and provide a routine designed to promote a return to fitness and discipline by the cheeriest, quickest route that can be devised. It may be staffed by an R.A.M.C. officer as commandant, a qualified masseur and an A.P.T. Corps N.C.O.—all specially trained in rehabilitation—with subordinate personnel only for such duties as cannot be performed by the cases themselves. Such a Centre may form a useful adjunct to the Convalescent Depot as thereby problems of administration and discipline may be solved *re* the Centre while the Depot gains a very convenient locus for temporary disposal of cases found slightly unfit either on arrival or during training. It is important that in such Centres a return to military discipline be insisted upon from the first, in preparation of the final tightening of discipline in the Convalescent Depot.

PART II.—REHABILITATION IN THE CONVALESCENT DEPOT.

Part I has dealt with those stages in which the progress of unfitness has been arrested and the recoil of fitness has carried the case so far on his upward road that he no longer needs nurse or medical treatment but wants facilities and skilled guidance to regain—or perhaps for the first time to attain—his maximum attainable fighting-fitness. That is the individual aspect; naturally the importance of rehabilitation rises as man-power falls and that consideration thrusts into prominence the supreme value of units each capable, per 1,000 beds, of annually converting 10,000 unfit men into front-line troops and thus continuously keeping an additional couple of brigades in the line. Special, separate consideration may thus well be given to modern provision for those convalescents who have reached a stage when they may be more appropriately styled “trainees.” At this pioneer stage in an innovation of such great consequence to our fighting forces of the present and industrial bodies of the future it is clearly our duty to pool the experience now being gained; the data and opinions embodied in this article are based upon the author’s recent experience (of some 30,000 convalescents) as Officer Commanding a Convalescent Depot.

*Stage 3.—The Convalescent Depot*¹—for trainees suitable for a course of training calculated to make them physically and mentally fit for full duty with full-line troops. From the civilian standpoint, this stage has been defined as “the stage between completion of massage and exercises and the point when the stresses and strains of heavy work can be undertaken” (Report of B.M.A.’s “Committee on Fractures”). The extent and speed of war-time progress in the handling of such men is indicated by the contrast of pre-war and present practice. Formerly such cases were given sick-leave; went home; got too much food and sympathy from their women-folk; took no exercise; and reported back to the military hospital physi-

¹ Subsequently referred to as the “C.D.”

cally flabby and mentally demoralized. Now they go from the hospital (Military, E.M.S. or Auxiliary) to a Convalescent Depot which, within a month, makes some 85 per cent of them fighting-fit; then they get a short spell of privilege leave home if due—not long enough to soften them but enough to provide a strong urge to speed their recovery in the C.D.—before rejoining their units, fully hardened. It is needless to stress the comparative advantages of the latter alternative line of treatment both from the individual and national standpoints. Nor is it necessary to stress the value of Convalescent Depots which, per 1,000 beds, can each return to the Army some 8,500 fit men per year after allowing 15 per cent for men found incapable of full rehabilitation to front line Army standard. Provision of similar—or perhaps the same—depots for officers is under consideration already; the provision of such depots for women members of the Crown Forces cannot long be delayed; already the very alert Ministries of Health and Labour are busily exploring civilian possibilities. Before proceeding to detail it is well to note two cardinal essentials to success. The first is that the trainee's day must be planned in a healthy mosaic of varied and interesting occupations affording full scope for his expanding energies without undue stress. This means that physical efforts must be progressive and be lightened by the psychological factors of play and competition and that mental recovery must be promoted by an atmosphere which is cheerful and inspiring without being exhausting. The second essential is correlated—it is the greatest possible knowledge—by some member of the staff, of the physical and psychological needs of each trainee. This provides an administrative problem not so impossible—of at least partial solution—in practice as it appears at first sight. Details may logically be considered in sequence under the headings as follows: the trainees; the depot premises, staff and administration; the objectives, training and testing; the results obtained and obtainable.

The Trainees—admissions and rejections.

Those suitable have been defined as “Medically fit by ordinary civil standards and only requiring an intensive course of training to re-educate their bodies to Army needs and their minds to Army discipline.” As this must be secured within a month, or six weeks at most, the training in this final, hardening stage must be robust. That fact imposes certain conditions. One is that rehabilitation must have been initiated during the man's stay in hospital at Stage 1; continued in the half-way house, during Stage 2; and so far advanced that no further medical treatment is needed save such physio-therapy as can suitably be given by the non-medical staff of the C.D. Cases found on arrival not to conform to these standards should be referred to a pre-hardening centre for a while lest they function as the slow ships which retard the convoy. Another condition is subtler; it is that the case should be psychologically ready to “play-up” in every way to the training and traditions of the C.D. The 1,000 bedded unit admits some 150 to 200 new cases per week derived, to the extent of 50 per cent

from E.M.S. Hospitals, 40 per cent from Military Hospitals and 10 per cent from Auxiliary Hospitals. An average batch may thus comprise:—

<i>Surgical - 60%</i>				<i>Medical - 40%</i>			
Hernias	...	...	23	Respiratory	...	...	27
Fractures and orthopædics	...	...	20	Digestive	...	...	17
Appendicectomies	...	...	8	Rheumatic	...	...	13
Meniscectomies	...	...	4	Skin cases	...	...	11
Varicose Veins	...	...	3	Urogenic	...	...	5
Miscellaneous	...	...	42	Miscellaneous	...	...	27
<hr/> 100 <hr/>				<hr/> 100 <hr/>			

It indicates the wide range of cases and hence the difficulty of organizing a rehabilitation system suitable for them all. Certain special classes need differential treatment, the most numerous being the herniotomies and the orthopædic cases.

The *herniotomies* serve to illustrate recent progress in the art of their rehabilitation in connexion with which experience at the rate of some 1,000 a year per 1,000 C.D. beds is valuable. The recent trend is to have active abdominal exercises practised by the patient before operation and resumed a few days after operation and we have not yet seen a resultant recurrence. Details of suitable exercises, as practised at one Military Hospital, are given in Appendix I. In the C.D., groups of twelve to twenty cases gain mutual confidence if given special abdominal exercises all together—under the eye of a medical officer who can forthwith detect not only the man who is in difficulties but also the man who is shirking. Such exercises are suitably graded for successive weeks and are taken daily. It is found better to give them in unbroken succession than to intersperse them with ordinary physical training exercises common to all trainees. About fifteen minutes of such special exercises at a time suffices.

Orthopædic cases on admission should be fit for group exercises but most of them need individual attention also. This consists of work, with perhaps a dozen similar cases, in the remedial gymnasium—under specially selected and highly skilled instructors supervised by an experienced medical officer. Ingenuity devises special apparatus and exercises for individuals while patient encouragement overcomes fear of pain or of the limb giving way under strain. The results are always good and often surprisingly so: apparently hopeless limbs may regain mobility, elasticity and strength at incredible speed as men are encouraged to be adventurous by proving it a safe and effective policy. At first such necessary orthopædic exercises must take precedence of all else but, as soon as he is able, the trainee shares the normal physical training of his group. It may be noted that it is not necessary for such special treatment to be supervised by the Orthopædic Surgeon who was in charge of the case while it was in hospital. Such cases are so numerous that the C.D. medical officers rapidly acquire the expert knowledge and experienced skill in remedial treatment—although only too pleased to seek the orthopædic surgeon's advice when in doubt.

The Psychological cases present most difficult problems, the handling

of which calls for much commonsense effort and still more patience. It is well to appreciate that severe illness or injury may cause definite psychological trauma which finds long-persisting expression in the form of fear that must be eliminated before rehabilitation can be deemed complete. While the final stages of this elimination can usually be effected in the C.D., it should be noted that cases of traumatic neurasthenia—resulting from some 1 per cent of all major accidents—are unsuitable for admission owing to their adverse influence upon the other trainees.

Slight Neurosis cases necessitate a policy based on most careful consideration. The practice of countering the neurotic tendency by cultivating its antithesis—the robust spirit of energy and confidence appropriate to healthy youth—involves a continuous strain upon the whole staff but particularly upon the Commanding and other Medical Officers who must inspire, develop and maintain that effort as essential to securing the best results from such an aggregation of semi-convalescents. While the C.O. sets the standard, the M.O.s co-operate by seeing that they or some member of the staff maintain contact with every inmate and show a personal interest in his welfare and progress. The physical training experts contribute by their boundless enthusiasm, resource and patience. The efforts of the whole staff thus create an atmosphere which is the antithesis of that in which the neurotic revels, for every trainee is rapidly convinced that his complete recovery is assured by special attention and he senses the *joie de vivre* of physical fitness nearing its zenith amongst friends also preparing for devoted service in the great crusade. Neurotic tendencies should die out in such an atmosphere of vitality, confidence, comradeship and good cheer. But men who have been ill or injured need much mental encouragement. The sick man's mind is, naturally, impressed by his weakness and the sooner he is made to exercise with the other men the sooner will he regain his lost confidence. Therefore I consider that as soon as the man is ready to leave hospital he should pass to the next stage and on into the C.D. His recovery is likely to be completed more quickly if he is quite away from the hospital atmosphere and in the hands of those who are accustomed to handling none but rehabilitation cases, and have the means, time and experience needed for speedy attainment of the best possible results. The greatest help in framing a policy is derivable from appreciation of the cardinal fact that many soldiers are little more than boys who, but a few years ago, were dreamy, gentle and unadventurous youngsters—the antithesis of the alert, quick, tough type which is best for war purposes. Sympathetic understanding of that fact induces the patience in training, the generous measure of praise and the constant encouragement which do so much to help develop the qualities required and hasten rehabilitation.

Cases Unsuitable for Admission.—Before dealing with the grading and grouping of those admitted it may be useful to list the chief groups of cases which should not be admitted:—

Those unlikely to be fit within six weeks,

Those with limbs in plaster and needing further special orthopædic attention,

Those who need other special surgical medical treatment,

Cases of traumatic neurasthenia or of psychosis with unresolved symptoms,

Cases requiring special diets,

Cases of infectious or contagious disease—of course.

Grading.—On admission—at the rate of about 50 a day—men are seen individually by the Commanding Officer, who picks out any obviously unsuitable or specially interesting cases. The Medical Officers then examine them in detail and place them in one of four grades. This work, in which the medical officers soon acquire skilful accuracy and speed, is much facilitated by each man bringing with him his medical documents, skiagrams and perhaps a special note on his hospital stage.

Grade 1 is the lowest and includes all hernias and orthopædic cases as well as any others who are obviously not very fit.

Grade 2 comprises the average medical and surgical cases.

Grade 3 takes those already fairly fit and likely to make a short stay.

Grade 4 is reserved for men who—having passed the *Grade 3* tests—will become A1 and are ready to begin the final strenuous training.

After this initial grading they are re-graded weekly by the Medical Officers who have supervised their training during the preceding week. As the physical training instructors attend, and may be consulted at, the examinations on which the re-grading of their trainees is based, it is seldom that a man is over-taxed by being put into a grade too advanced for his condition. The use of differentially-coloured shoulder-tabs for the grades serves to accentuate a helpful *esprit de corps*.

On parading the new arrivals one is perturbed by the appearance of the great majority, whose bad physical condition is shown by their flabbiness and whose low morale is betrayed by their personal untidiness and slack bearing. Few have had any preliminary physical training in hospital—military or auxiliary.

Homogeneous groups being preferable to mixed, the four grades are each divided now into three main groups—of which there are thus twelve—according to their disability. These are (a) Abdominal; (b) Orthopædic; and (c) General—the orthopædics being transferred to the general group when sufficiently advanced. The groups should be kept as small as possible, so that every man may be kept under personal observation, for which purpose daily programmes are so arranged that several instructors are available for each grade at each period.

When graded and grouped, the new arrivals are welcomed to this genial forcing-ground for rapid maturation by being given a “pep talk” designed to appeal to their instincts—and point the way—on planes which rise from the level of selfish materialism, subtly camouflaged, to that of selfless patriotism suitably stressed.

(To be continued.)

A REPORT ON SOME EXPERIMENTS ON THE TRANSPORT OF CASUALTIES.

By CAPTAIN J. C. JOHNSTON.

Royal Army Medical Corps.

In the last few months I have been fortunate in being an Instructor on a Stretcher Bearer Course at a Battle School. During that time I was trying to teach methods of evacuation of casualties in almost every conceivable situation and it is the results of experiments carried out there during the courses that I have recorded below.

Altogether three ideas were tried out with reasonable success, two for pack carriage of casualties and the third mechanical.

- (1) Cradle for carrying casualties by pack animal.
- (2) A double litter-travois.
- (3) Cycle attachments for the Miller-James stretcher carrier.

The first is an attempt to produce a cacolet for horses which will permit the carriage of serious cases as the approved pattern does not. The second is only changing the original litter (R.A.M.C. Training, 1935, para. 459) to new uses and the third an attempt to adapt the Miller-James stretcher carriage for use as a small mechanized ambulance.

I do not pretend that these pieces of equipment are all in their finished form as one of my reasons for publishing this report is the hope that other medical officers will try out these ideas and improve on them; for instance, I happen to know that a new litter has been constructed entirely of metal, weighing very little more than the one described and, although not fitted as a travois, does away with almost all the other disadvantages.

I wish to thank Brigadier Morgan and Private Cobb for the excellent diagrams which they drew for me and also the several R.A.S.C. farriers and the R.A.O.C. personnel who gave me technical advice and carried out excellent work for me.

I am indebted to Colonel J. H. Bayley, M.C., firstly for his continued advice during the experiments and secondly for his permission to forward this report.

I.—CRADLE FOR CARRYING CASUALTIES BY PACK ANIMAL.

Uses.

- (a) To carry two unconscious patients in Neill Robertson stretchers.
- (b) To carry two lightly wounded as in a horse sitting cacolet.
- (c) To carry patients with moderate leg injuries by using in conjunction with Thomas splints.

Advantages.

It can be used for unconscious or seriously injured patients; two patients are evacuated by one horse; it can be used as a sitting cacolet and

is more satisfactory for injured legs as there is no tendency for the arm upright to cut into the injured leg as in the authorized model. It has been tested with two twelve stone patients doing $3\frac{1}{2}$ miles on horse on a track in less than one hour. The horse was sweating slightly at the end of this but not at all distressed.

Disadvantages.

Heavy, as the weight of the Neill Robertson stretcher (30 pounds) has to be added to that of the cradle, making a total of 55 pounds a side. Rigid, does not fold up when not in use. A tubular metal cradle would reduce the total weight.

Description.

This is an iron cradle formed by two U-shaped pieces of iron, $1\frac{1}{2}$ by $\frac{3}{4}$ inch, the inner arm having a ring to fit the hook of the pack saddle and the outer being shorter, each having a slot at its upper end to take the straps of the back rest when it is being used as a sitting cacolet. These pieces are held together by one outer, one bottom and two inner cross pieces, also a piece of wood riveted to the outside of the long arms to protect the saddle leather. The rear U-shaped piece is narrower than the front one by 4 inches and from it there is a V-shaped extension ending in a small hole $\frac{7}{8}$ inch. The weight of the pair of cradles is 50 pounds and the overall length is 3 feet 9 inches.

Method of Use.

(a) *For an Unconscious Patient.*—The patient is strapped into the Neill Robertson stretcher without using the outer arm strap and the stretcher placed on the cradle with the wheels just clear of the front arm and the spike fitted into the hole at the end of the extension from the rear arm. The arm strap of the stretcher is passed over the outer and one of the inner cross pieces and buckled on patient's chest. A stretcher sling or leather strap goes around the leg of the stretcher and extension just above the hole for the spike (fig. 2). Patients of equal weight are loaded simultaneously on either side of the horse (it takes at least three men to load each side) by slipping the rings on the cradle over the hooks on the saddle. The whole is fixed by a circingle (figs. 3, 4, 5, 6). If the patients are of unequal weights some object, e.g. horse's nose-bag, can be hung on the outer arm and loaded to make the weights level. It is found to be advantageous to fasten the patients' legs together across the horse care being taken to see that the strap does not rub the horse, i.e. it must rest on the harness.

(b) *To use for men with moderate leg injuries,* the cradles are changed to opposite sides of the horse so that the extension sticks forwards. A back strap is fixed across the new rear U-shaped piece, cacolet cushions are put on it and fixed to the bottom of the cradle. Patient sits facing horse's head, Thomas splint is applied and patient loaded so that the injured leg is the one nearer the horse, i.e. left leg injury sits on right side of the horse, the

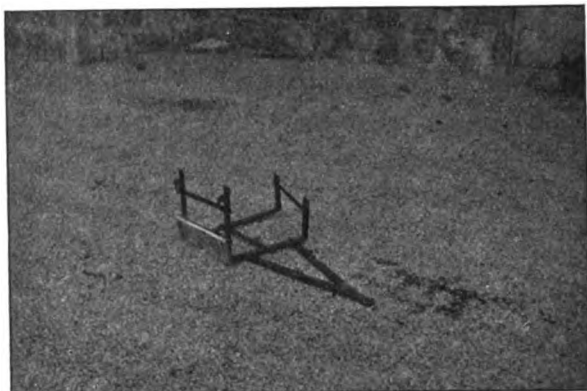


FIG. 1.

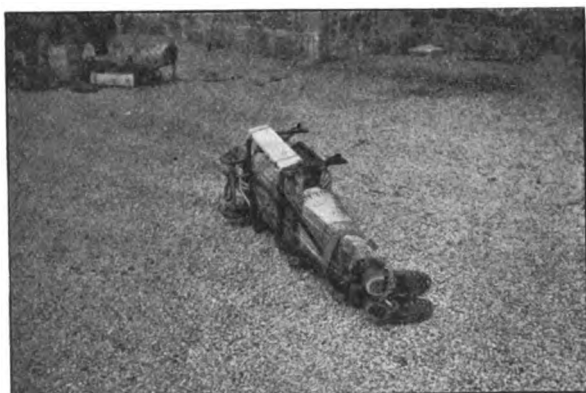


FIG. 2.



FIG. 3

good leg hangs over the outside. In order to prevent the leg resting directly on the extension bar a small metal upright may be clamped between the extension bar and the splint to keep the two apart. The Thomas splint is strapped to the hole in the extension to prevent the patient slipping forward in the seat.

(c) *For minor injuries* the cradle is put on in the normal way, the back strap is fixed to the rear U, the cushions tied on as in (b), the legs hang over the free edge and the foot rest is strapped on to it.

N.B.—The cushions, back strap and foot rest used were the authorized ones from the issued sitting cacolet.

It has now been possible to produce a pair of tubular steel cradles which sacrifice little or nothing in strength and score heavily in weight. These only weigh 17 pounds each or 34 pounds per pair as opposed to 50 pounds per pair as in the original models. This means that, used for unconscious patients, the total weight, less patients, of the pair with the stretchers will now be 94 pounds against 110 pounds originally and when used as a sitting cacolet will weigh 40 pounds a pair against 56 pounds for the authorized model.

A further improvement introduced in this model is to reduce the length of the extension so as to reduce the amount of sway in the patient's legs; a cut of 3 inches has been made and experiments are still being carried out on these lines.

II.—DOUBLE LITTER-TRAVOIS.

Object.

This is an adaptation of the mule litter as described in the R.A.M.C. Training Manual but, owing to the necessity for economy in horses, I experimented on this litter to see if it would carry two patients. This finished litter is described below; one patient is placed above the body and one underslung. I tried this out with two patients of $11\frac{1}{2}$ stone weight over a distance of ten miles travelling at a rate of $3\frac{1}{2}$ to 4 m.p.h.; two of these were across heather and bog. At the end of this one horse was sweating a little and the other not even doing that.

Description.

It is constructed of two wooden shafts of 4 by 2 inches, 22 feet 1 inch long with two cross pieces of similar wood 2 feet 9 inches wide. These are counter sunk and bolted and the joints are strengthened above and below by bars of metal bolted on. The front shafts are 5 feet 6 inches and the rear 10 feet 1 inch, the under surfaces of the ends of the rear shafts being curved to act as slides. 10½ inches from the rear is a metal crosspiece to prevent the shafts closing on the flanks of the rear horse. It is held in position by a swivel on one shaft and a bolt and wing nut on the other; it must be released if in use as a travois, otherwise the bar will catch on boulders, tree stumps, etc.

Underneath the rear crosspiece are two double pronged fittings to take



FIG. 4.



FIG. 5.

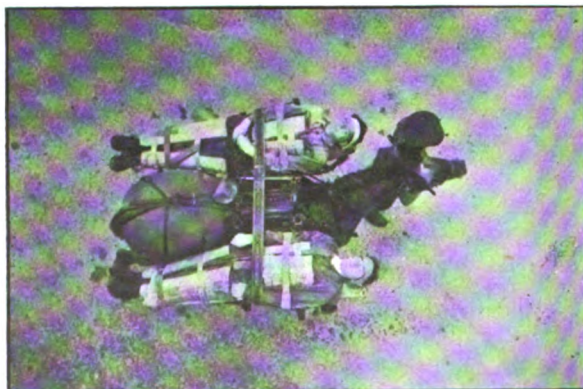


FIG. 6.

the handles of the stretcher retained by bolts and wing nuts. The whole is stayed to the sides of the litter. On the upper surface are two pairs of uprights of metal at either side, the centre strips of these pairs being joined to make a large inverted U. The whole structure is stayed to the shafts and the top stretcher rests on this stay, the handles being retained by a pair of bolts and wing nuts. If in use as a travois a further pair of bolts forms the bar on which the stretcher handles rest, being held by a third set of bolts and wing nuts. The total height of this structure is 2 feet 7 inches and of the lower $9\frac{1}{2}$ inches from the crosspiece. The two fittings on the front crosspiece are both the same height as this latter.

On the front crosspiece both the upper and lower fittings are identical, being two pairs of uprights above and below, each forming a narrow inverted U and the whole being stayed as in the rear fitting thus forming a socket 2 inches by $2\frac{1}{2}$ inches to take the stretcher handles.

On each shaft is fixed a metal slide for the chains which suspend the litter from the saddles. I think that 6 inches by 2 inches should be sufficient. The chains are in pairs and must be adjusted to bring the shafts of the litter well on to the pack saddle.

The litter is completed by a tarpaulin or waterproof cover over the top stretcher to protect the patients from the weather.

The total weight of the litter is 180 pounds.

Figure 7 shows the complete litter. A diagram in my possession shows the upper front fitting as being longer than the lower which is incorrect.

I think that all the various sets of bolts and wing nuts described should be replaced in any future models by some form of split pins, preferably the type in which the end drops, automatically locking it. Even these should be chained to the uprights to prevent loss.

Uses.

(a) It can be used as the normal litter with two patients and two horses (fig. 9).

(b) It can be used as a travois with two patients and one horse (fig. 8).

Advantages.

(1) Over the original litter in that two horses now carry two patients instead of one.

(2) Seriously ill patients can be carried with relative comfort. I myself have travelled quite long distances in it without feeling any marked discomfort from the sway which is really very slight.

(3) Should a horse be killed the journey can be completed by using it as a travois.

(4) For short journeys it could be used as a travois, i.e. one horse, two patients.

(5) It has a relatively long range; over light country 10 to 20 miles, over heavy about 8 to 12 miles.

Disadvantages.

(1) It is long and unwieldy and difficult to turn; this can only be done by moving in a fairly wide arc.

(2) If the horses get bogged it is extremely difficult to free them.

(3) Using it as a travois throws a big strain on the frame and for this reason it would not be suitable over heavy country. Further the rear lower fitting will catch on the ground and would need to be detachable or hinged in order to prevent this.

(4) Used as a travois with two patients it tends to be a little top-heavy.

(5) It is difficult to transport from place to place.

Methods of Loading.

(a) *As a litter.*—The lower patient is placed on a stretcher on the ground under the litter with his head towards the rear horse; he is lifted and the stretcher handles slipped into the forward loops and the rear handles into the sockets and bolted in position. The upper patient is not placed on the stretcher until it has been fitted on to the litter (this is due to the travois fitting and is not found in double litters without it). The patient is loaded with his head towards the hind quarters of the rear horse. This balances the weights and having the patient's head above the level of the front horse is an obvious advantage.

(b) *As a travois.*—The rear horse is removed and the metal crosspiece opened, the patients are both loaded on their stretchers and then on to the travois. The front end of the lower stretcher is in its normal position but the rear end is in the fitting for the rear of the upper stretcher, the front end of the upper in its normal position and the rear end in sockets on the top of the extension on the rear crosspiece.

III.—IMPROVED ATTACHMENTS FOR STRETCHER CARRIAGE.

(a) Bicycles can be used to tow a patient on a stretcher carriage by using two very simple pieces of equipment which can be made from scrap by any L.A.D.

Firstly a yoke of overall length 31 inches—V-shaped with a crosspiece to steady it. On the two top ends of the V there are brackets which slide on to a clamping platform for the stretcher on the carriage (fig. 10). This consists of two flat lips which slide either side of clamp fixed at one end at right angles to a piece of tubing about 4 inches long, the top lip being flush with one end of it and the other being connected by a metal fin. The whole is clamped by a bolt and thumbscrew at the free end. The yoke is made of 1 inch tubular metal and has an angle downwards 16 inches from the tip, angled again to bring it parallel to original line and thus forming the other end of the piece attached to clamp previously mentioned. The apex of the V finishes off as a flat piece of metal 3 inches long with a hole in it of 1 inch diameter.

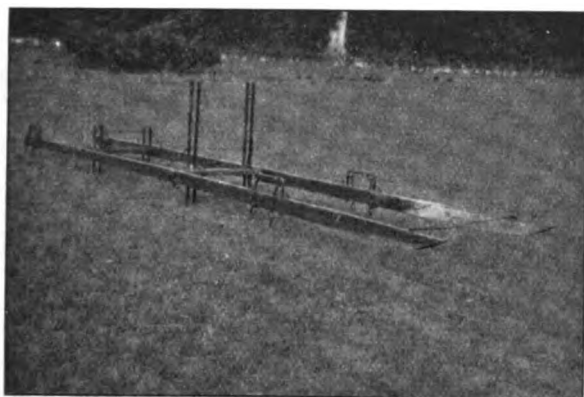


FIG. 7.



FIG. 8.

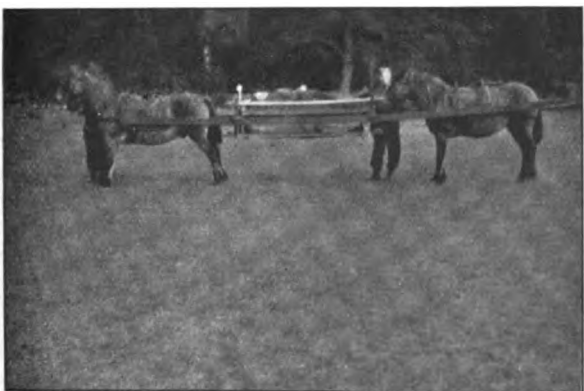


FIG. 9.



FIG. 11.

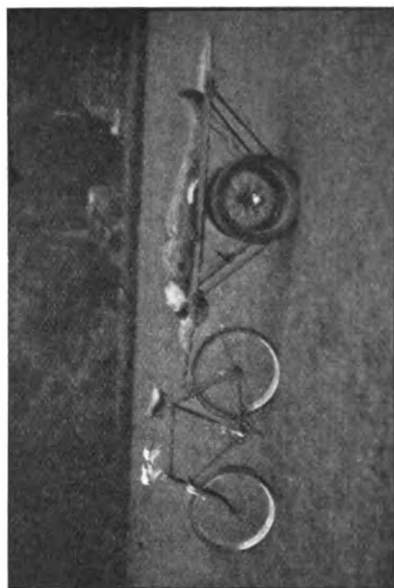


FIG. 13.

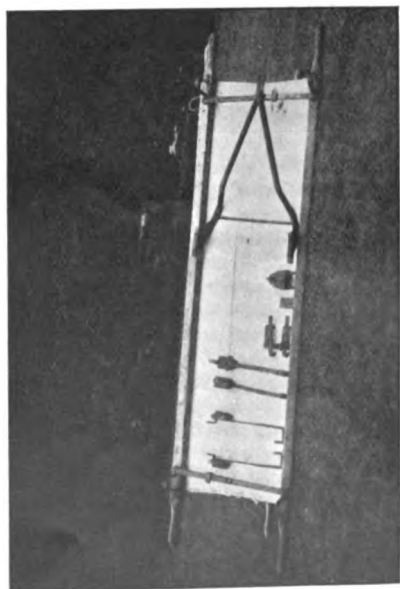


FIG. 10.

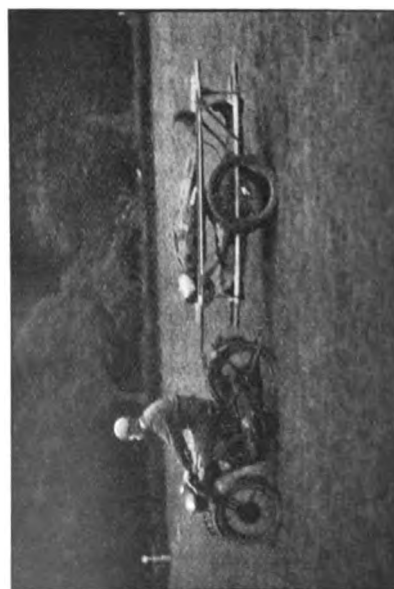


FIG. 12.

On to the bicycle is fitted an L-shaped bracket clamped to the back bar of the bicycle just below the saddle by two nuts and bolts. On the toe of the L there is a pivot to fit the hole on the yoke and about 2 inches long. It is fitted with a split pin to retain the yoke.

In this way a patient can be towed by a bicycle, being loaded with his head towards it. It is quick and conserves man-power, one man one patient. It has the disadvantage that it is hard work and cannot be used up any but the smallest incline (fig. 13). It is easy to use on paths or roads.

(b) M/C's can be used for the same job by using a different bracket for the pivot. The pivot is on a flat strip and on the rear of this are two hooks bent downwards to go around the bars on the M/C carrier. On the front are two slots, two strips of metal fit into these slots, and they have hooks on each for the same purpose. These strips have holes bored to fit the various types of bicycle and are held by bolt and wing nuts (fig. 11). The yoke is held on by a retaining split pin. The yoke is the same as that used for the bicycle.

It is obviously uneconomical to take only one patient on a carriage with a M/C so an attachment can be made to allow a second stretcher to be under-slung on the carriage. This consists of four fittings, one for each runner of the top stretcher. A block of wood is cut to fit the runner, a strip of metal encloses this and $1\frac{1}{2}$ inches project over the top on the inside. To the outside is fixed another small piece which can be turned to act as a catch; on the inner end there is a shaft, overall some 15 inches long, and at the end there is a hook turning inwards and big enough to take the wooden shaft of a stretcher. The lower stretcher has its travois bar broken and the metal fittings which fit through the runners keep it from closing on the patient. Care must be taken to see that the lower stretcher does not bounce on the axle of the carriage.

N.B.—The M/C exhaust does not affect the lower patient. Should it happen to do so, however, an extension can be fitted to the exhaust to carry the fumes away from the trailer.

The patients are loaded with their heads towards the M/C. The lower patient should always be the less seriously injured of the two. The top stretcher should have a canvas or tarpaulin cover to protect patients from the weather; this applies also to the bicycle method (fig. 12).

N.B.—It is advisable to check that the split pins retaining the wheels of the carriage are firmly fixed.

TYPHUS IN THE GOLD COAST.

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FROM time to time a disease resembling typhus has been described in West Africa while positive Weil-Felix reactions have been recorded in Europeans and Africans in all the British West African Colonies.

In Nigeria, Davies and Johnson (1921) reported a series of cases in fifteen Europeans and three Africans occurring from July to October, 1920, in various towns, Kano, Kaduna, Zaria and Naraguta, of the Northern Province. Pyrexia lasted for from ten to thirteen days, being at its maximum from the fifth to seventh days, and subsiding by lysis. A profuse rubeolar rash appeared from the fourth to sixth days, lasted for at least two weeks and was visible, though fading, for several weeks. No serological reactions were carried out.

These cases may all have been due to rickettsiæ or, as originally suggested, to a fever of the dengue group.

In 1936 Gordon and Davey reported that in Sierra Leone, of 45 cases of fever, 5 gave positive Weil-Felix reactions in titres of more than 1 in 100 with Proteus OX19 and OX2; three patients, one Sudanese male and two Sierra Leone females, had symptoms consistent with a disease of the typhus group.

Thereafter more precise information is available for the typhus group of fevers in West Africa. One case was described from Mpraeso, in the forest region of the Gold Coast, by Alexander (1937) in which the serum agglutinated Proteus OX19 in a dilution of 1: 2560 while in the Medical Report of the Gold Coast Colony for 1933 it is reported that of 53 sera from patients with pyrexia, 6 agglutinated Proteus OX19 in dilutions varying from 1:125 to 1:5120; these six sera were all from patients residing in Cape Coast and Winneba.

In Nigeria, Naudi (1938) and Davey (1938) reported two cases from Kano in Northern Nigeria in one of which the serum agglutinated Proteus OX19 up to 1:1280.

Hughes and Baldwin (1942) recorded two cases in Africans in Lagos in which agglutination with Proteus OX19 occurred in a dilution of 1:1280. It was concluded that the infection was flea-borne though no laboratory evidence was brought forward in support of this conclusion and both in

Northern Nigeria and on the seaboard of the Gold Coast the louse population has been sufficient to sustain large epidemics of relapsing fever.

In the Gambia, Bowesman (1939) reported nine cases of a typhus-like fever in Georgetown in 1938 in Africans, while in 1939 an African woman in Bathurst was found to be suffering from a febrile illness which was followed by the development in her blood of agglutinins for *Proteus* OX19 in a dilution of 1:3000. In the Annual Medical Report of the Gambia for the year 1938 it is stated that 5 persons were admitted to hospital with typhus of whom 4 are said to have died: no other details are given.

More recently Smith and Evans (1942) have described a series of cases in military personnel in Bathurst and its neighbourhood in which the sera gave positive agglutination with *Proteus* OX19.

In the following communication an account is given of the isolation of typhus rickettsiæ from a patient in Accra, Gold Coast, from *Rattus rattus* and from *Cricetomys gambianus* the giant rat, obtained in the same town.

CLINICAL OBSERVATIONS.

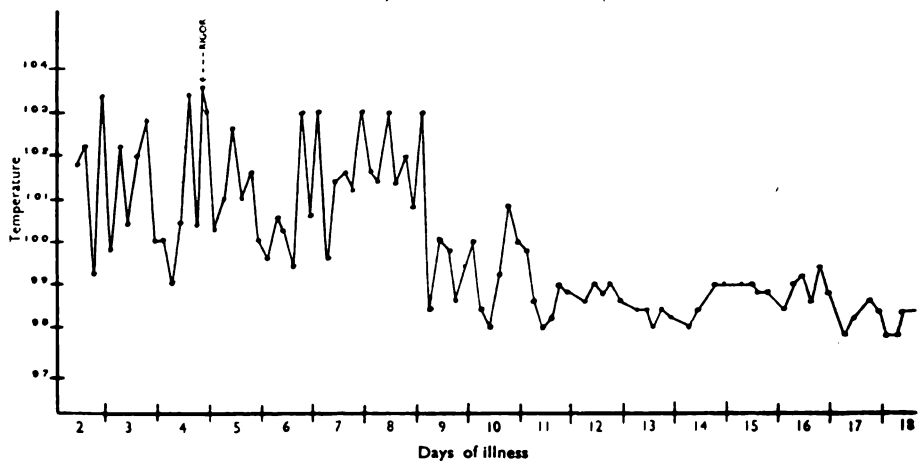
Clinical details of the case from which the rickettsiæ were isolated are as follows:—

R., aged 41, European, was working as Censor in a Cable Office.

Apart from attacks of malignant tertian malaria there was nothing of note in her previous history.

The first sign of illness began June 21, 1942, with tenderness in the lymph nodes of the right axilla: the nodes were found to be slightly enlarged. There was no headache and no fever. These symptoms continued till the late afternoon of the following day when headache developed and there was general malaise with vague aches and pains in the back and limbs: there was also pain in the femoral lymph node: the temperature was 101.0° F. On the morning of June 23 the temperature was 99.4° F. The patient, having taken quinine on the previous evening, attempted to carry on with her work, but in the middle of the morning she had two rigors and was admitted to hospital. On admission the temperature was 101.8° F., pulse 90, respirations 24: complaint was made of severe headache, generalized pains in the legs and back: the spleen and liver were not enlarged: the bowels not open. At 10 p.m. the temperature was 103.4° F. and there were no malarial parasites in the blood. On the fourth day a rigor occurred, the temperature rising to 103.6° F., the headache and feeling of intense tiredness continued; the patient vomited once; the eyes were rather suffused. Although no malarial parasites were found, in view of the patient's history, an intra-muscular injection of 6.25 grains of quinine was given: intra-muscular injections were repeated on the next two days without any effect on the temperature. Vomiting again occurred on June 25, and on this day, the fourth day of illness, a papular rash began to appear; it was first seen on the anterior aspect of the deltoid muscles, later on the abdomen, chest and back and to a lesser extent on the limbs. On June 26 the rash became even more marked, the papules erythematous and diffuse. The rash continued till the temperature began to fall and was still faintly visible for three to four weeks during convalescence whenever the patient took a hot bath. No definite primary eschar was noticeable but a red patch about 2.0 cm. in breadth was visible on the back of the right

shoulder. At the height of the temperature on the fifth to eighth day of the illness the posterior cervical lymph nodes were just palpable but there was no sore throat. The tongue was covered with a white fur and the patient had little appetite: constipation continued until the temperature fell. The pulse was increased in rate throughout the illness and even in convalescence was 76 to 80. There was no evidence of bronchitis or bronchopneumonia. Apart from the marked asthenia and headache there were no definite nervous symptoms but, on the fourth to eighth day of the illness, there was some mental confusion and at night, though the patient slept, there were confused nightmares. Shooting pains in the limbs and hyperæsthesia in the legs were also noted, the latter condition continuing into convalescence. The urine was febrile in character but free from albumen. For the first three weeks of convalescence an intense feeling of fatigue developed on the slightest exertion; thereafter the patient rapidly returned to normal. A blood culture taken on the sixth day of illness was bacterio-



Temperature Chart of Typhus Case

logically sterile; on this day also blood was removed for inoculation into animals.

A Weil-Felix reaction carried out on the fifth day of illness was negative.

On the seventeenth day, the serum agglutination with *Proteus* OX19 was positive in a dilution of 1:100 and with *Proteus* OX2 in a dilution of 1:250.

ISOLATION OF RICKETTSIÆ FROM THE PATIENT.

Blood was removed from the patient on the sixth day of illness and was allowed to clot in the refrigerator. The serum was separated off and the clot ground up in physiological saline. Two male guinea-pigs were each inoculated intraperitoneally with 1 c.c. of the patient's serum, two other male guinea-pigs were injected with 1 c.c. of ground up blood clot. The two guinea-pigs inoculated with serum showed no thermal reaction during the ensuing twenty four days. Of the two guinea-pigs inoculated with clot, one (guinea-pig No. 35) was killed on the eighth day after injection although

it had shown no febrile reaction: its spleen and brain were removed and ground up to form a 10 per cent suspension in physiological saline. Two guinea-pigs (Nos. 50 and 51) were injected intraperitoneally with 2 c.c. made up of equal parts of the brain and spleen suspensions of guinea-pig No. 35. These guinea-pigs showed a rise of temperature above 104° F. on the sixth and eighth days after inoculation.

In the meantime the second of the original guinea-pigs injected with the patient's blood clot had shown a temperature of 104.2° F. on the eleventh day after inoculation. It was killed forty-eight hours later with a temperature of 104.8° F.: at the post-mortem examination no scrotal reaction could be seen; the heart blood, spleen and brain were bacteriologically sterile.

An emulsion of 1 c.c. each of brain and spleen was inoculated intraperitoneally into two other guinea-pigs (Nos. 54 and 55). Guinea-pig No. 54 had a temperature of 104.4° F. on the fifth day after inoculation, guinea-pig No. 55 a temperature of 104.0° F. on the sixth day after inoculation. Guinea-pig No. 54 continued to show a temperature above 104° F. for three days after which the temperature returned to normal: at no time did it show a scrotal reaction. Guinea-pig No. 55 was killed after the temperature had remained above 104° F. for forty-eight hours. Heart blood, spleen and brain were bacteriologically sterile and the tunica vaginalis, although no scrotal reaction was detectable during life, was slightly hæmorrhagic. As before, brain and spleen were injected into two guinea-pigs (Nos. 60 and 61) both of which had febrile reactions on the fifth day after injection. In addition both guinea-pigs developed bilateral scrotal reactions easily visible during life. On killing these guinea-pigs (the third passage) the tunica vaginalis was very hæmorrhagic and rickettsiæ were found in smears made from it, typical Mooser cells being detected. Rickettsiæ were almost entirely intracellular. Blood, brain and spleen were bacteriologically sterile while apart from the lesions in the tunica vaginalis the only histological changes noted were in the brain where occasionally there were seen minute hæmorrhages surrounded by small numbers of polymorphonuclear leucocytes. After six passages of this strain of rickettsiæ in the guinea-pig the incubation period gradually grew longer to eight, eleven and fourteen days and finally in the tenth passage no febrile reaction occurred so that the strain had presumably died out.

Brain and spleen from the fourth guinea-pig passage had however been injected into the two original guinea-pigs that had been inoculated with the patient's serum. Neither of these guinea-pigs developed a febrile reaction, although such a reaction occurred in normal guinea-pigs inoculated with the same material. The guinea-pigs inoculated with the patient's serum had thus apparently suffered from a subclinical infection which had conferred immunity.

ISOLATION OF RICKETTSIÆ FROM RATS.

In order to determine the source of infection an examination of rats from Accra was carried out for rickettsiæ.

Through the kindness of the Medical Officer of Health of Accra, to whom our thanks are due, rats were caught in various parts of the town, more especially from the area in which the patient had worked. All the rats were *Rattus rattus* which here shows considerable colour variation of the coat from deep black to light brown. *Rattus norvegicus*, if it occurs, is now very rare in Accra. In all 44 rats were examined. After killing with ether the brains were removed, ground up in physiological saline to make a 20 per cent suspension, and injected intraperitoneally in doses of 1 c.c. into guinea-pigs.

In order to conserve guinea-pigs the suspensions injected were prepared from the brains of two, three or four rats. Two guinea-pigs were inoculated with each suspension. In all 26 guinea-pigs were thus inoculated with pooled suspensions of the 44 rats' brains. Either no thermal reaction occurred or in both guinea-pigs the temperature rose above 104° F. The number of rat brains and the results are shown in the table:—

No. of Experiment	No. of rat brains in suspension	Reaction	No. of days from in- oculation to reaction
1	4	+	10,11
2	4	—	—
3	4	—	—
4	3	+	7,7
5	3	—	—
6	4	+	8,8
7	3	—	—
8	4	—	—
9	2	—	—
10	3	—	—
11	4	+	5,5
12	2	+	12,14
13	4	—	—

It will thus be seen that in 8 of the 13 experiments the guinea-pigs showed no rise in temperature above 104° F. during the 28 days after inoculation for which period they were kept under observation; in the other 5 experiments a rise in temperature above 104° F. occurred in from 5 to 14 days after inoculation, 17 rats being involved.

To ensure that the thermal rise was not due to bacterial infection, cultures were made from the heart blood, spleen and brain of all guinea-pigs two or more days after the temperature had remained above 104° F.

As in the case of the human strain, it was noted that an orchitic reaction was not produced in male guinea-pigs with the strains derived from rats until at least three passages had been made in guinea-pigs. Although occasional guinea-pigs showed a thermal reaction with rat passage strains on the fifth day after intraperitoneal injection the usual interval before the onset of fever was seven days. Sometimes, even after the third passage, occasional male guinea-pigs failed to develop an orchitic reaction. One rat strain after four guinea-pig passages was transferred to male white rats, passage being made by intraperitoneal injection of guinea-pig spleen and brain emulsion. The rats showed a thermal reaction on the fifth and sixth days after injection and in both cases developed a slight degree of orchitis with injection of the tunica vaginalis.

In order to determine the relationship of the rat strain to that isolated from the patient, two guinea-pigs which had recovered from the reaction caused by the human strain were inoculated intraperitoneally with spleen and brain emulsion from the fourth guinea-pig passage of a rat strain. During four weeks' observation the guinea-pigs showed no rise in temperature up to or above 104° F. The human strain therefore appeared to protect guinea-pigs against subsequent inoculation with the rat strain of rickettsiæ.

CRICETOMYS GAMBIANUS WATERHOUSE AND MURINE TYPHUS.

The Giant Rat *Cricetomys gambianus* Waterh. (Twi name, Okisi, Ga name, Obii) is an extremely common rodent throughout the Gold Coast and although originally a bush rat is now fully established in towns, competing successfully against *Rattus rattus*. In addition, in Accra at the present time, its predominant flea is the common rat flea *Xenopsylla cheopis*. *X. aequisetosus*, which has been reported as being found on *C. gambianus* both in the Gold Coast and Ivory Coast, has not been met.

An original attempt was made to infect two giant rats with the human strain after three passages in guinea-pigs. Neither of the giant rats showed any significant rise in temperature but, on killing them on the tenth day after inoculation and injecting a suspension of their brains and spleens intraperitoneally into two guinea-pigs, a reaction occurred in both guinea-pigs five days after inoculation. Subsequent passages of this strain were carried out in guinea-pigs.

Later, inoculations of the rat passage strain were made into *C. gambianus* with similar results; spleen and brain were found to contain rickettsiæ from seven to fourteen days after inoculation.

In view of these results an effort was made to determine whether *C. gambianus* was naturally infected when obtained from an area in which *Rattus rattus* was carrying the rickettsiæ of murine typhus.

In all, twelve *C. gambianus* were trapped from the area in which the patient had been working and where infected black rats were also found. The brains were removed, 20 per cent suspensions in saline from two giant rats being inoculated intraperitoneally in doses of 1 c.c. into two guinea-pigs. Of the twelve guinea-pigs thus inoculated two showed febrile reactions on the sixth and eighth days after inoculation. In subsequent passages in guinea pigs an orchitic reaction was not seen before the third passage.

A guinea-pig which had recovered from the febrile reaction induced by the *C. gambianus* strain subsequently showed no febrile reaction on inoculation with the rat passage strain of rickettsiæ.

The rat strain was thus found to cross-immunize with both the human and the *C. gambianus* strain.

Since the evidence thus suggests that *C. gambianus*, although showing

no clinical reaction to infection, can nevertheless act as an alternative reservoir to the black rat for murine typhus, an attempt was made to find out whether fleas collected from *C. gambianus* were infected with rickettsiæ. Fleas were removed from two giant rats ten days after the rats had been inoculated intraperitoneally with the human rickettsiæ strain. The fleas, all provisionally identified as *X. cheopis*, were washed in saline, ground up and injected intraperitoneally into two guinea-pigs. These guinea-pigs reacted with a temperature above 104° F. on the fifth and sixth days after inoculation. Subsequent guinea-pig passages of the flea-transmitted strain were carried out.

THE SUSCEPTIBILITY OF SOME OTHER AFRICAN ANIMALS TO MURINE TYPHUS.

The following species were also inoculated intraperitoneally with an emulsion of infected guinea-pig spleen and brain.

<i>Cercopithecus æthiops sabaeus</i> L.	...	...	Green monkey
<i>C. mona lowei</i> Thomas	...	...	Mona monkey
<i>Civettictis civetta</i> Schreb.	...	...	African civet
<i>Thryanomys swinderianus</i> Temm.	...	...	Cutting Grass or Cane rat
<i>Python regius</i>	...	...	Royal Python

None of these animals showed any febrile or other reaction and none developed a positive Weil-Felix reaction except the African civet which gave a positive agglutination with *Proteus* OX19 in a dilution of 1:50: the significance of this reaction requires further investigation.

DISCUSSION.

From the patient whose symptoms are here described it has been possible to isolate rickettsiæ which produced a febrile reaction in guinea-pigs, associated with an orchitic reaction after the third guinea-pig passage. This would indicate that the rickettsiæ belong to the murine type although the incubation period in guinea-pigs was more commonly seven days than four. On the other hand, in the diffuse rash from which this patient suffered and in the marked anorexia, characteristics found in other cases in West Africa that have developed a positive Weil-Felix reaction, the disease approximated more closely to epidemic typhus.

Typhus rickettsiæ of similar type to that obtained from the patient were however isolated from black rats and from *Cricetomys gambianus* which is now becoming a town as well as a bush rat. These findings indicate that infection was most probably contracted by direct transmission from rats by means of infected rat fleas. The patient, however, was in the habit of removing ticks daily from a Persian cat which just before her illness is said to have been off colour. Blood was removed from the cat and inoculated into guinea-pigs which showed no reaction. Similarly an emulsion of ticks *Rhipicephalus sanguineus* obtained from the cat caused no reaction on intraperitoneal injection into guinea-pigs.

It is possible, however, that the cat may have harboured a few stray *X. cheopis* obtained from rats. There is in addition some evidence that the cat flea, *Ctenocephalus felis*, though a less efficient vector than *X. cheopis*, may also transmit typhus rickettsiæ. These sources of infection cannot be altogether excluded in this case.

Although the evidence thus shows that the rickettsiæ isolated approximate to the murine typhus type there is evidence from Mexico, the Balkans and more recently Spain (Romero Escacena, *et al.* 1941) that the responses observed in experimental animals are not decisive criteria on which to base the classification of rickettsiæ.

Our thanks are due to Brigadier R. A. Hepple for permission to publish this paper and for his interest in these investigations and to Dr. Critien, Senior Medical Officer, Colonial Medical Service, for his kindness in placing the clinical details of the case at our disposal.

CONCLUSIONS.

1. A case with symptoms suggestive of murine typhus is described from the Gold Coast: from this case rickettsiæ were isolated which caused fever and, on the third passage in guinea-pigs, orchitis.

2. A similar type of rickettsia was isolated from local black rats and from the giant rat *C. gambianus*. Guinea-pigs infected with the human strain were immune to the rat strain while guinea-pigs recovered from infection with the *C. gambianus* strain were resistant to the rat strain.

3. Since *Xenopsylla cheopis* obtained from *C. gambianus* is capable of transmitting the rickettsiæ the bush rat may be an alternative host to the black rat.

4. Neither the green monkey *Cercopithecus aethiops sabæus* L. nor the Mona monkey *C. mona lowei* Thomas showed any signs of infection when inoculated with the rickettsiæ.

5. Serum from an African civet *Civettictis civetta* Schreb agglutinated a suspension of OX19 at a dilution of 1:50, following injection with rickettsiæ.

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A FATAL CASE OF BLAST INJURY OF THE LUNGS ASSOCIATED WITH A CURIOUS LESION OF THE CEREBRUM.

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GUNNER C. T., aged 26, was injured by the explosion of a small grenade of enemy manufacture. He was seen two hours later. Shock was severe, the radial pulse was weak but could be counted, and the rate was 120. His skin was cold and pale and he had probably lost much blood. He was quite conscious but apathetic and slow in answering questions, which often had to be repeated. His replies, however, were deliberate and rational. He was unable or disinclined to give a clear description of the accident but he described the grenade as being like a silver ink bottle.

The external injuries were as follows. *Left arm:* The hand was blown off at the carpo-metacarpal joint. *Right arm:* The thumb and next two fingers and the radial part of the hand were missing or shattered. *Chest:* The brunt of the explosion had fallen upon the left side of the chest anteriorly and the whole of this area was blackened and pitted with numerous small wounds, the largest being 2 cm. in diameter. The injuries extended with diminishing intensity across the mid-line for 4 or 5 cm. and, below the level of the seventh rib in the nipple line, there was little damage. There was no evidence of penetration of the wall of the chest. *Head and Neck:* From the left side of the chest upwards over the neck and left side and front of the face the skin presented the same blackened appearance and many small wounds. The left eye-ball was penetrated and collapsed and the right cornea was scratched. The skin of the face was scorched superficially and the hair singed. A little blood still ran from lacerations about the lips and there was blood in the mouth and nose. *Abdomen:* The belly was uninjured except for scattered superficial scratches. *Legs:* The anterior and inner aspect of both thighs showed many wounds like those elsewhere but more scattered and smaller.

Clinical examination at this stage was brief. No examination of the nervous system was made, nor of the chest other than inspection. It was observed that breathing was quiet; there was no bubbling and no froth or blood escaped from the nose or mouth other than a few dark drops that appeared to come from the cut lips; and the patient was able to move all his limbs. His condition seemed good enough to allow of immediate operation with the help of intravenous infusion of plasma.

Operation.—Four hours after injury anaesthesia was induced with pentothal and continued with gas and oxygen. First the **left forearm** was amputated above the wrist. While the amputation was in progress the

patient's breathing became embarrassed and the anæsthetist, Major R. W. Cope, had difficulty in maintaining an airway. When he inserted a laryngoscope in order to pass an intratracheal tube bright red frothy blood was seen to issue in some quantity from the larynx. Once the tube was in position and suction had been applied the patient breathed more easily for a time.

The appearance of frothy blood from the trachea seemed to indicate penetration of the lung and the wounds of the chest were therefore dealt with next. The five largest were excised and carefully explored. None was deeper than the under surface of the pectoralis major. It may be noted that all these wounds contained shreds of clothing and scraps of bright metal like aluminium, none more than a few millimetres in diameter; a typical finding in injuries due to explosive engines of the money-box class. It was also remarked that there was much curious bruising of the subcutaneous fat in and about each wound. Fat droplets floated in the exudate and the fatty tissue around had lost its normal structure and seemed to be liquefying.

By the time the other hand, the right, and the face had been dealt with, the operation had lasted two hours. The airway had never been quite satisfactory in spite of repeated suction applied to the intratracheal tube (yielding in all about 3 ounces of frothy blood mixed with mucus). The pulse had become very feeble and during the operation suspiciously little blood had flowed from cut vessels. Though a cannula had been inserted into the internal saphenous vein at the beginning of the operation the plasma had failed to flow smoothly, probably because the peripheral veins were collapsed. 400 c.c. of reconstituted plasma were therefore injected through the cannula by means of a syringe, taking about fifteen minutes. No further surgery was possible at this stage on account of the man's poor condition and the wounds were therefore dressed after liberal dusting with sulphathiazole powder.

In the meantime breathing had become very laboured. Though the pulse was a little stronger the patient grew more cyanosed and he seemed likely to die of anoxæmia. The picture was that of respiratory obstruction. The anæsthetist was satisfied that this was due to blood in the main air passages and equally satisfied that there was no impediment above the larynx. The man was therefore turned on to his left side, half prone. All respiratory distress ceased promptly. A transfusion of 500 c.c. of fresh blood was begun and the pulse rapidly improved.

All seemed well for the next half-hour. Then respiratory bubbling began again, to be relieved once more by sucking out the blood from the intratracheal tube. From this time, however, the chest never seemed quite dry. The intratracheal tube was removed and found to be patent. Two hours later the man was returned to bed, lying half prone with the head and mouth low.

Next morning his condition was worse and he was breathing 40 times

a minute. A little blood continued to ooze from his mouth. In spite of repeated efforts to clear the upper air passages, and the administration of oxygen by means of a B.L.B. mask for four hours continuously, he grew weaker and died thirty-seven hours after the injury.

Though more than thirty hours elapsed from the end of the anæsthetic till death he never regained consciousness.

Post-mortem Examination (ten hours after death).—Operation wounds. All looked clean. No further significant observations were made.

Chest.—Pleural cavities: The left contained about six ounces of liquid blood and the right about four ounces.

Thoracic wall: The absence of penetration was confirmed. All the ribs and sternum were intact and the parietal pleura looked normal. In the loose tissue behind the sternum several small patches of hæmorrhage were noted but there was none in the intercostal muscles or parietal pleura.

Lungs: Both lungs contained much blood, especially the upper lobes anteriorly, and the right and left lungs were equally affected. Towards the thin anterior and lower borders of the upper lobes the lung substance was solid with blood. More laterally the surface of the lobe was less affected. On section, however, it was seen that only a thin layer of tissue had escaped and at a depth of a few millimetres the lung was solid with blood through to the mediastinal surface. Those portions of the lungs in relation to the heart and neighbouring parts of the mediastinum had suffered most. Above and behind, towards the thickest parts of the upper lobes, infiltration with blood became patchy and the visceral pleura related to the lateral and posterior wall of the chest was normal in colour apart from scattered subpleural spots of no depth on the paravertebral surface. The fatty tissue about the hilum of the upper lobes contained a few areas of hæmorrhage.

When the lung was incised the heavily infiltrated parts dripped blood and were seen to be honeycombed with rounded cavities up to 2 cm. in diameter filled with soft clot and fluid blood without trace of lung tissue. The non-hæmorrhagic parts of the upper lobes, and the lower lobes, were fairly well aerated but presented occasional small patches of subpleural and parenchymatous bleeding. Both lower lobes were a little congested and contained some fluid. In short, the appearances commonly noted in lungs in death a day or two after an operation were reversed. That is to say, parts of the upper lobes were solid and dark and did not collapse whereas the lower lobes were by contrast pale, crepitant and shrunken.

Air passages: The mucosa of the trachea was injected and there was a little frothy blood in the lumen. In the bronchi there was more blood and the small tubes, leading to solid hæmorrhagic areas, were full of liquid blood.

Pericardium and heart: The anterior surface of the pericardium was dappled with small hæmorrhages, more evident on the parietal than the visceral surface, and the pericardial sac contained a slight excess of faintly blood-stained fluid. On the anterior surface of the right ventricle towards

the root of the pulmonary artery and extending into the areolar tissue above the pericardial reflection was an irregular area of patchy hæmorrhages about 4 by 3 cm. in extent. The blood-stains were heaviest in the epicardial fat but also extended through the muscular wall of the ventricle to be seen plainly on the endocardium. The neighbouring part of the interventricular septum was also faintly stained.

Other Thoracic Organs.—These presented no abnormality.

Abdomen.—Nothing unusual was detected.

Brain.—The skull was intact and the dura mater appeared to be normal.

The surface of the brain showed signs of increased intracranial pressure. The gyri were distinctly flattened, there was tentorial grooving and a small cerebellar cone.

Over wide areas of the hemispheres a little subpial bleeding had taken place and the cortex was superficially lacerated in two spots: in the left temporal region behind the Sylvian point and on the orbital surface of the left frontal lobe behind the olfactory bulb.

Attention was focused on two regions upon the convexity of the brain (not the sites of subpial hæmorrhage already mentioned), which stood out on account of an unusual lilac-pink colour. That on the right involved the whole of the posterior two-thirds of the parietal lobe; on the left the pre- and post-central gyri were similarly affected. In these parts the gyri were notably enlarged and the brain swollen and soft. On section these areas presented a striking picture. The liliaceous tint extended through the depth of the grey matter of the cortex distinguishing it very precisely from the white matter which, to the eye, appeared to be unaltered. Though unchanged in colour, the white matter beneath the abnormal cortex was so soft that it could be wiped away from the cortex with ease and by this means the gyri could be readily dissected out intact.

The appearance of the surface of the brain suggested that the junction of damaged and normal cortex was abrupt but section revealed a similar but less intense alteration in colour of the grey matter outside the limits described, fading peripherally.

The deeper parts of the cerebrum, the brain stem and the cerebellum seemed to be normal, apart from the signs of intracranial hypertension already described.

HISTOLOGY.

Vast numbers of recent capillary hæmorrhages are to be seen in the grey matter of the cerebral cortex. There is no gross change in the nerve cells, however, and no appreciable cellular infiltration. The white matter shows little change and only occasional points of bleeding. Such degenerative changes as there are in the nerve cells probably took place after death.

Preparations stained with scarlet red do not reveal any evidence of fat emboli.

COMMENT.

The injury to the lungs in this case can only be accounted for by the blast of the explosion. Though only about one-third of the pulmonary tissue was affected the damage was intense; much more so than that described by Zuckerman [1] (1941) in his experimental animals. There is however, a difference in the kind of blast to which Zuckerman's animals and this patient were exposed. The animals were subjected to the effect of a relatively heavy charge of explosive several feet away. In the case of the patient the distribution of the wounds shows that he was holding the grenade in front of his chest, probably in the left hand, and at a distance of not more than one foot. Consequently he received the force of a relatively small explosive charge at very close quarters and upon a limited area of his body.

The lesions found in the brain, on the other hand, do not resemble any described hitherto as following death from blast. For example, Zuckerman writes, "No changes were observed in the cortex, mid-brain, pons or medulla of monkeys subjected to pressures [i.e. blast pressures] as high as 110 pounds per square inch. . . . Changes in nervous tissue are more pronounced in rabbits exposed to high pressures. Pial hæmorrhages occur on the surface of the cortex and hæmorrhage from the tela choroidea, filling the ventricles, has been observed. Hæmorrhages have not been seen, however, in either the grey or white matter of the brain." O'Reilly and Gloyne [2] (1941) describe a case of blast injury fatal in four hours in which the autopsy revealed "Brain congested with small submeningeal hæmorrhages over vertex and base. A little free blood in ventricles. No lesion in substance of brain."

Nevertheless, in the case now described there is no factor other than the effect of the explosion to account for the changes in the cortex. They were not due to fat emboli.

SUMMARY.

- (1) A fatal case of multiple injuries due to the explosion of a hand grenade at very short range is described.
- (2) The external injuries were not in themselves fatal.
- (3) There was extensive hæmorrhagic infiltration of the lungs, typical of the kind due to blast.
- (4) An unexpected finding at autopsy was a peculiar discoloration of large areas of the cerebral hemispheres due to great numbers of minute hæmorrhages confined to the grey matter of the cortex.

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Editorial.

PORT AND WHEN TO DRINK IT.

OUR Editorials have been serious of late; serious with the import of strenuous times. The whole trend of the *Journal of the Royal Army Medical Corps*, in fact, has been and must continue to be, for the present at least, heavily weighted with the cares and responsibilities of the supreme occupation in which the Corps is so deeply engaged.

And yet we confess to a longing for lighter things; things to amuse and hearten us; things to set us up again so that we may the better face the solemn tasks which now beset us. This idea came to us, the other day, when we heard, at an old and distinguished Club, an ex-officer, a man who had succeeded wonderfully with the command of a General Hospital in France during the last war, break away, suddenly, in the midst of a typical now-a-day's conversation, with a notion of a new and revolutionary kind. "How few," he remarked suddenly, "realize that a glass of really good port, an hour or two before dinner, is much to be preferred to a glass of the same at the usual time when all the sensibility of the palate has been lost by the tasting of this dish and that, this wine and the other; and the appreciative faculty confused by bibulous thinking, turgid talk and, perhaps, even tobacco."

This remark, by a man to whom port is now denied because of the restrictions of war, and whose dinner is usually a drab affair that may nourish but is hardly likely to set up a glorious confusion, struck us as very remarkable.

Whether he was right or wrong might be open to question but there was no doubt that, under the hard and scaly outer crust of his personality, so fit to bear the extremes of fire watching and of A.R.P., there still smouldered jewels of the imagination, flashes of fancy, ready to shine again as brightly as before if once the clamorous needs of civil or military defence were assuaged and A.R.P. done with for ever! Whether he was right or wrong? Why, surely he was right! Right, not so much in his opinion on when to drink appreciatively as in his burst into a serious conversation with a remark that set us all by the ears and led men who had been discussing the Beveridge Plan into a fascinating diversion on port!

Are we not all the better for such lapses? Is the pursuit through Libya and Tripoli to Tunis so much to be preferred as a subject for lunch talk, or the Beveridge Plan so portentous, that all lighter things are to disappear from our conversation? It may remain subject matter for medical speculation whether port is best taken before or after dinner or whether, with the freedom of choice once more in our possession, we ought to drink it at all or choose some other wine! We recall an old rhyme on

the subject dating from the first encouragement of Portugal by the British Government then in office somewhere in the eighteenth century.

Firm and erect the Caledonian stood,
Old was his mutton and his claret good.
“ Let him drink port ” an English Statesman cried.
He drank the poison and his spirit died.

And, on the other hand, who can forget Dr. Middleton of “ Diana of the Crossways ” in his wonderful relapse over the bottle ?

Let us remember the choice that was once ours. Let us realize that it may yet be ours again.

Let us, by all means, talk of military operations, civil defence or financial measures and talk of them with great intelligence to boot ; but there are some light things which *must* come to the surface now and then—and our appreciation of port and when to drink it may well be one of them.

The point is that cultured men like the readers of this Journal cannot be expected to be always at the height of their own subject. There are moments when they must relax if they are to go on bearing their heavy burden successfully.



Clinical and other Notes.

FIRST-AID STANDARD LECTURE FOR TROOPS.

BY CAPTAIN J. JACQUES SPIRA,
Royal Army Medical Corps.

LECTURING on First-aid to troops is, at the present moment, an important problem which should engage the attention of all Medical Officers. This matter does not only concern the Military Authorities since, in total war, the civil population is equally exposed to suffer heavy casualties. It becomes, therefore, a question of nation-wide importance and it should receive serious and urgent consideration from all concerned. It has already been suggested (the *Lancet*, Vol. I, p. 79, 1942) that the competent bodies should consult on the subject and devise a series of lectures with the object of standardizing the teaching of First-aid.

I have been lecturing to troops for some time on this subject and, when addressing both large bodies of men and classes of Warrant Officers and Serjeants, I was struck by the confusion which existed in their minds.

In tackling these lectures, it is, in my opinion, essential to consider two aspects of this problem:—

(1) What is the man's mental capacity to absorb this totally new subject-matter?

(2) What is the minimum knowledge which, from our point of view, he must acquire to prove of any use during an emergency?

In respect of the first point it will be obvious that, since education varies so much amongst the masses, the lectures must be conceived in the simplest language and that the important principle must be strongly emphasized and frequently repeated so as to leave a lasting impression on the listener's mind.

The second point will, no doubt, create many difficulties and give rise to much controversy. But it is absolutely essential that we should agree on the fundamental principles which have to be taught and their easy application. Manuals on First-aid are practically useless because they are burdened with a great number of irrelevant details. On the other hand "a little learning is dangerous." But to be useful in an emergency, is it necessary to have some smattering of anatomy and physiology? Should we teach that "the pelvis is a propeller-shaped bone"? Should we distinguish between arterial and venous hæmorrhage? Should we memorize pressure points? If the man remembers these, will he be able to locate them in a shocked casualty? Is it necessary to point out the difference

between epilepsy and syncope? Personally, I think that the more we keep away from "medical" subjects, the better for all concerned.

I have obtained very gratifying results by arranging my lectures on a plan which I wish to submit for further discussion and hope that this will produce the "Basis for a Standard Lecture to Troops."

Two lectures should be sufficient: The FIRST to encompass the WHOLE subject, the SECOND to be a repetition of the first in synopsis form and afford an opportunity for questions by lecturer and audience. Each lecture to last, roughly, thirty to forty-five minutes, thirty minutes for a small class and forty-five minutes for a large body.

PLANNING OF LECTURE.

(Notes for Medical Officers.)

The lecturer should begin by stressing that First-aid (as the words imply) is only concerned with the immediate attention to COMFORT, and the strict avoidance of all *painful* manipulations. The subject-matter of the lecture falls under three headings:—

- (1) SHOCK¹ (or collapse)—ONE treatment—WARMTH.
- (2) HÆMORRHAGE—ONE treatment—PRESSURE (local or direct). (Demonstration of the aseptic application of the Field Dressing.)
- (3) FRACTURES—ONE treatment—IMMOBILIZATION (Improvisation of splints—absence of splints.) (Division into closed (simple) and open (compound) fractures, the latter to be dealt with by treatments TWO plus THREE plus ONE.)

The treatment of compound fractures, therefore, provides the opportunity to recapitulate the whole subject-matter and to present it in a nutshell.

The classes should finish with what may be called, good-humouredly, "COMMUNITY SINGING." The whole class repeats in unison the following set sentences, which the class should memorize:—

Treatment for Shock	WARMTH.
Treatment for Hæmorrhage	PRESSURE.
Treatment for Fracture	IMMOBILIZATION.
Treatment for Compound Fracture	ARREST HÆMORRHAGE.
	IMMOBILIZE FRACTURE.
	PROVIDE WARMTH.

BURNS and BLAST should be mentioned briefly:—

BURNS should be protected from air, BLAST casualties should not be moved and treated for shock only.

It is suggested that this approach to the subject is simple, clear, avoids

¹ When lecturing to classes of O.C.T.U.s, Commandos or similar units, it should be mentioned that shock abolishes pain, that the greater the injury, the greater the shock, therefore, generally speaking, the casualties do not suffer physical discomfort and, in extreme cases, are even unaware that they may be dying.

boredom and confusion, and makes the lecture sufficiently interesting to focus the men's attention on the vital points.

It is further suggested that the realization of "sufficient" knowledge of First-aid contributes to the morale of the troops.

SELECTIVE MEDIA FOR THE ISOLATION OF BACT. DYSENTERIÆ.

BY MAJOR R. W. FAIRBROTHER.

Royal Army Medical Corps.

SELECTIVE media have been extensively used for the isolation from fæces of the salmonella organisms but until recently they have proved of little value in the case of the dysentery group. An important advance was made when Leifson (1935) introduced a special medium containing sodium desoxycholate which inhibited coliform organisms without interfering with the growth of the Flexner dysentery organisms. This medium has been slightly modified by several workers (Hynes, 1942, and Gallie, 1942), with good results. Another selective medium has been prepared by Wilson and Blair (1941) who added potassium tellurite, iron-alum and rosolic acid to lactose-agar. This medium allowed *Bact. dysenteriae* (Flexner) to grow profusely but inhibited most coliform strains. These new media have proved much more efficient than MacConkey's medium for the isolation from fæces of the pathogen in Flexner dysentery.

An opportunity was afforded of testing the relative value of these media for the isolation of dysentery bacilli from the fæces of carriers when observations were made on a number of men who had come from the Middle East and gave a definite history of bacillary dysentery some one to three years previously.

Technique.—Samples of fæces were emulsified with an approximately equal part of saline and, after the heavy particles had deposited, the following media were heavily seeded: MacConkey, desoxycholate-citrate and Wilson and Blair. After overnight incubation suspicious colonies were subcultured and subjected to biochemical and serological tests. The latter tests were carried out by both slide and macroscopic agglutination with complete agreement.

Desoxycholate-citrate medium was prepared at the Army Media Depot and issued in three portions: (1) agar with Lab. Lemco peptone solution, neutral red and lactose added; (2) solution A containing sodium citrate, sodium thiosulphate, ferric citrate and distilled water; and (3) solution B containing 10 per cent sodium desoxycholate in distilled water. For use 5 ml. each of solutions A and B are added to 100 ml. of the agar and plates poured. The full details are given by Hynes (1942).

Wilson and Blair Medium was prepared in the laboratory by adding to

melted agar, rosolic acid, iron-alum and lactose-tellurite solution (see original paper).

Results.—The media were used (a) for the isolation of dysentery organisms from fæces and (b) for the study of pure cultures of various organisms. The examination of fæces is divided into two groups, (1) men with clinical signs of active dysentery and (2) men without definite clinical signs of infection.

(1) *Cases of Active Dysentery.*—Six cases were under observation; in no case were the fæces examined until the third or fourth day of the illness. *Bact. dysenteriae* was isolated from four cases (three being Flexner strains and one Sonne). In each instance pure cultures were obtained with the desoxycholate medium while, with MacConkey, many coliform organisms were also present; Wilson and Blair's medium was not used.

(2) *Old Cases of Dysentery.*—Fæces were collected from 260 individuals who had had a recent attack of dysentery. These were examined in two batches (Table I).

TABLE I.—ISOLATION OF DYSENTERY BACILLI FROM THE FÆCES OF OLD CASES.

Medium	Batch 1		Batch 2		Total Number	Positive
	No. examined	No. positive	No. examined	No. positive		
MacConkey	154	0	170	0	324	0
Wilson and Blair ..	154	3	—	—	154	3
Desoxycholate-citrate ..	154	6	170	24	324	30

The first 154 samples of fæces, collected from 90 men, were inoculated on to the three media. Members of the dysentery group were isolated on six occasions with the desoxycholate-citrate medium and on three occasions with the Wilson and Blair medium but negative results only were obtained from MacConkey medium.

In the second batch single specimens from 170 men were examined on the desoxycholate-citrate and MacConkey media. Members of the dysentery group were isolated on 24 occasions and, in each case, only on the desoxycholate-citrate medium. From one case both Flexner and Shiga strains were isolated.

The strains isolated are indicated in Table II.

TABLE II.—STRAINS ISOLATED FROM 324 SAMPLES OF FÆCES.

Strain	Number
Shiga	9
Flexner	18
Schmitz	2
Sonne	1

Both new media proved more efficient than MacConkey for not only did they give positive results but also, as there was a marked inhibition of the coliform organisms, the examination of the cultures was considerably simplified. With some positives, however, only a few colonies of the dysentery organisms were obtained.

Examination of Pure Cultures.—A trial was made of the suitability

of these new selective media for the growth of various organisms which may be present in fæces and all of which grow well on MacConkey. Recently isolated cultures were used in each case.

Desoxycholate medium suppressed almost completely most coliform organisms and to a less extent the paracolon and atypical coliform organisms; it had little action on *Proteus* strains. All types of dysentery organisms grew well. The growth of Sonne strains was interesting as Leifson originally considered that these organisms were inhibited. It appears that he was using old, rough strains and not smooth strains which are usually encountered in the examination of fæces.

The preparation of this medium is important and should be carefully controlled. Some batches have been found to have little inhibiting action on coliform organisms, which produce marked precipitation of the desoxycholate salts and so render the examination of cultures from fæces very difficult.

Wilson and Blair's Medium behaved, as regards inhibitory action, in a similar manner to the desoxycholate medium. In some of the media rosolic acid was omitted, with the result that cultures of fæces tended to give a profuse growth of *Strept. faecalis*. All strains of dysentery bacilli grew on this medium; the Sonne strains, however, tended to develop slowly.

SUMMARY AND CONCLUSIONS.

The desoxycholate-citrate medium proved greatly superior to MacConkey's medium for the isolation of dysentery bacilli from the fæces of carriers. Results also indicate the superiority of the Wilson and Blair medium over MacConkey. There is no justification for the continued use of MacConkey's medium in the examination of fæces for the dysentery organisms.

I wish to thank Mr. G. C. Pascoe and Serjeant E. Payne, technical assistants, for much help during this investigation.

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STRETCHER BED FOR USE IN FORWARD AREAS.

BY COLONEL ST. J. D. BUXTON, F.R.C.S.,

Consultant Surgeon (Orthopædic), M.E.F.

In a Field Ambulance, the sick or wounded soldier lies on a stretcher resting on the ground or elevated on boxes or petrol tins. In the Casualty Clearing Station or Mobile Hospital some bedsteads may be available but many patients are accommodated on stretchers.

The warfare of the present campaign has necessitated some changes in the units in which surgical work is carried out. It is unlikely that beds can be provided for patients in forward areas. This stretcher bed was designed to provide something between a hospital bedstead and the stretcher resting on the ground.

The constituent parts are standard ordnance equipment excepting one small addition to every fourth or fifth suspension bar.

The advantages of the stretcher bed are: (a) The stretcher is kept off the ground; (b) it will stand on a flat floor or in sand; opportunity has not been available to test if it will stand on pasture land, on which a camp may be made at home but, if so, the damp from the ground will be kept away from the stretcher; (c) it is unnecessary to transfer the patient to another stretcher when being evacuated; (d) a backrest and/or a support for the lower limb can be added quickly.

Specifications.

Stretcher (Mk II or C.C.S.)	...	...	...	...	1
Suspension bars	...	...	...	...	3
Suspension bar with riveted straps ¹	...	...	...	...	1
Blankets, brown, single	...	...	...	...	1
Pillows, feather, medium	...	...	...	...	1
Pillows, air, circular, 18 in.	...	...	...	...	1

Preparation.—Fix to a stretcher three suspension bars pointing downwards, one at either end with the third in the centre. The stretcher bed will now stand on the cross bars of the three suspension bars.

Fix one suspension bar with the vertical upwards as near as possible to one pair of handles. The bar with the riveted straps is for this purpose and forms the back rest. The straps can be used to prevent a "knee donkey" from sliding down.

Fold a blanket lengthways three fold. Place the centre over the back rest, pulling the ends down towards the centre of the stretcher. Thus six folds will be on the upper half of the stretcher.

Place the inflated circular air-pillow underneath the third fold of the blanket.

If a mackintosh sheet is available it can be placed on the stretcher before arranging the blanket. The air-pillow can be enclosed in a pillow case.

When used with fractures of the lower limb another suspension bar can be added at the bottom end of the stretcher.

The pillow should be inserted after the patient has been lifted on to the stretcher bed. He should be supported in a sitting posture and the pillow placed between him and the blanket. The most comfortable arrangement is for the pillow to be placed lengthways.

¹ O.S., M.E.F., are issuing suspension bars in nests of four or five, one bar having straps riveted on in the centre of each upright. These straps hold the nest together and serve a purpose stated below.

I am indebted to Serjeant D. E. Bristow for the photographs, to Major J. Revans, I.M.S., for technical help and to Major-General Sir P. S. Tomlinson, K.C.B., D.S.O., for permission to forward this note for publication.

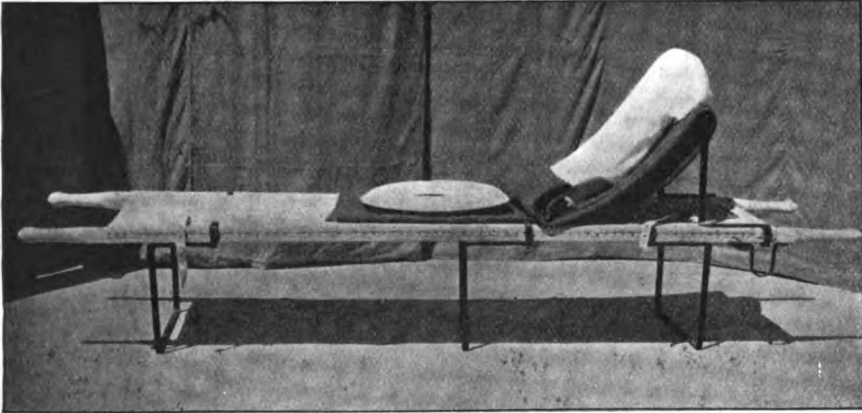


FIG. 1.—Stretcher bed prepared. The top three folds of the blanket have been turned back to show the air ring.

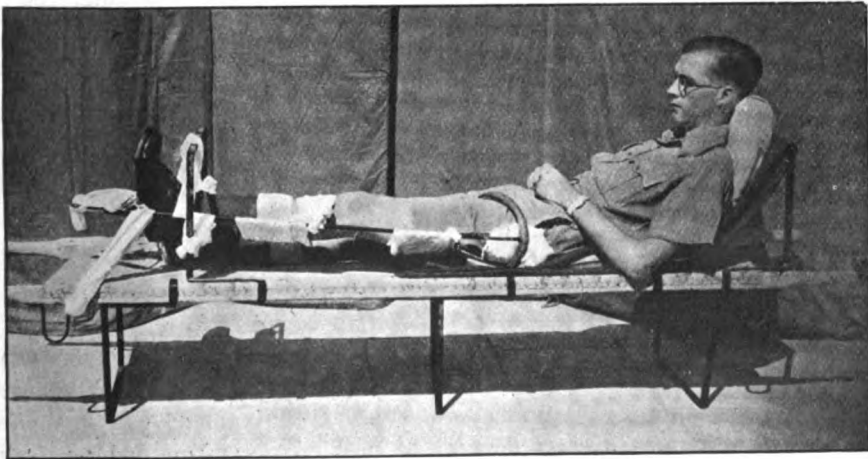


FIG. 2.—Stretcher bed in use, showing back rest and Thomas' splint fixed to suspension bar.

[Suspension bars were used for support stretchers on occasions during the war 1914-18 but their use as improvised back rests is a novel feature of this article.

It may interest readers to know that proposals have been put forward to increase the scale of (2 feet 6 inches) trestles, folding, in the equipment tables of Field Ambulances and Casualty Clearing Stations.—ED.]

PHENOTHIAZINE TREATMENT OF MULTIPLE INTESTINAL
HELMINTHIC INFESTATIONS.

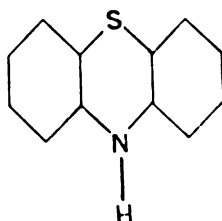
By CAPTAIN W. G. M. ELLIOTT, M.A., M.D.Dubl., M.R.C.P.I., L.M.,
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Medical Specialist to a General Military Hospital, West Africa.

PHENOTHIAZINE was first used as a vermifuge by veterinary surgeons. It is toxic to culicine larvæ and inhibits the growth of horn-fly larvæ in the fæces of cattle and is effective in eliminating Strongyloid worms from the guts of sheep.

Manson Bahr, in 1940, gave the first report of its use in treating the helminthic intestinal infestations of man. He reported good results in the treatment of threadworms (*Enterobius vermicularis*) in children and in cases of round worm (*Ascaris lumbricoides*) but stated the drug had no effect in eliminating hookworms (*Ankylostomida*). His paper was written following the treatment of three adults and six children. The author has just completed an investigation which has shown the effectiveness of intramuscular injections of Phenothiazine in dealing with Dracontiasis amongst native troops in West Africa (paper in publication).

Pharmacology of Phenothiazine.—The drug is a pale lemon yellow, photosensitive, crystalline powder. It is almost insoluble in water and has a faint but bitter taste. Its formula is



When given orally or parenterally, the absorbed fraction is excreted in an oxidized form, the latter exerting some antiseptic action in the urinary tract. The terminal oxidation product is a red dye which may turn the urine red on standing. Administered orally to infants or young children in small doses it may produce damage to the hepatic system or blood forming organs. Hubble (1941) reported a case of toxic hepatitis with jaundice and anæmia in a girl of 12 who had been given 24 grammes of Phenothiazine over a period of seven days. The American workers de Eds, Stockton and Thomas (1939) reported the development of anæmia in three out of nineteen patients given Phenothiazine, the total dosage in each case being 22·4, 28·1 and 19·9 grammes respectively. They recommended that the maximum adult dose should not exceed 15 grammes without a rest period. The toxic effects do not appear usually till treatment has been given for a few days. As Hubble points out, these effects are probably related to the

benzene structure of the Phenothiazine molecule, which brings it into line with such substances as trinitrotoluene, dinitrobenzene, dinitrophenol and arsenobenzene derivatives.

In view of these findings, especially when treating infants or young children, a close watch should be kept for toxic signs or symptoms, both during and after the cessation of treatment. The author has treated twenty-six cases of intestinal helminths with oral Phenothiazine and eighteen cases of dracontiasis by the intramuscular route without any toxic effects. The patients were all adult West African native troops of military age.

Method of Treatment.—The following routine method of treatment was adopted. On admission, the patients were put on a semi-solid diet, composed of such foods as Bengers, Ovaltine, Horlicks, egg flips, Bovril, soups, custards, etc. Biscuits, rusks and thin slices of bread and butter with jam were allowed and the patients were encouraged to restrict their fluid intake to three pints of fluid or less in the twenty-four hours. Two ounces of glucose three times a day were added to the dietary, supplemented by two ounces of Bemax and a teaspoonful of Marmite daily. On the first evening, half an ounce of sodium sulphate was given on retiring and repeated first thing in the morning. The first stool passed was sent to the laboratory and treatment started forthwith. On the above diet, 4 grammes of Phenothiazine were given morning and evening for two days and 8 grammes on the morning of the third day. Four hours after giving the last dose of the drug, 1 ounce of sodium sulphate was given and the patient placed on a full diet.

Three consecutive stools were then sent to the laboratory and, if these were adjudged free of parasites, the patient was discharged from hospital and told to report back in a month's time for stool check up. Should a further course of treatment be necessary, it should not be started for a period of three weeks. If any signs of impending toxicity develop, such as headache, nausea, vomiting, diarrhoea, jaundice or abdominal discomfort, the treatment should be stopped immediately. In the case of infants and children, it is advisable to keep them under observation for a week following discharge from hospital.

Results of Treatment.—Altogether, ten different varieties of intestinal parasites were subjected to Phenothiazine therapy. The results following one course of the above treatment are shown in Table I.

From this investigation it would appear that Phenothiazine is effective in eliminating the helminths *Trichuris trichiura* and *Strongyloides stercoralis* and that the drug has undoubted value in the treatment of *Ankylostoma duodenale* and *Tania saginata*. It appears to have little action on amœbæ or *Cheilomastix mesnili*.

None of these patients showed any signs of toxicity, which was in marked contrast to the gastro-intestinal disturbance produced by such drugs as filix mas, carbon tetrachloride and oil of chenopodium. Vomiting was frequent in the cases treated by these older methods and one patient treated

TABLE I.

	1	2	3	4	5	6	7	8	9	10
<i>Ankylostoma duodenale</i>	+/-	+/-	+/-	+/-	+/-	+/-	+/-	+/-	+/-	+/-
<i>Entamæba histolytica</i>	+/-	+/-	+/-	+/-						
<i>Trichuris trichiura</i>	+/-	+/-	+/-	+/-						
<i>Ascaris lumbricoides</i>	+/-	+/-	+/-	+/-						
<i>Entamæba coli</i>	+/-	+/-	+/-	+/-						
<i>Cheilomastix mesnili</i>	+/-	+/-	+/-	+/-						
<i>Strongyloides stercoralis</i>	+/-	+/-	+/-	+/-						
<i>Tænia saginata</i>	+/-	+/-	+/-	+/-						
<i>Iodamæba büschlii</i>	+/-	+/-	+/-	+/-						
<i>Trichomonas hominis</i>	+/-	+/-	+/-	+/-						

Explanation :



A : Stool + for parasite before treatment.

B : Stool + or - for parasite after treatment.

by a combination of carbon tetrachloride and oil of chenopodium developed a toxic hepatitis with jaundice. Many of the patients were in a state of latent or manifest multiple vitamin deficiency, lack of the B₂ factor being much in evidence. The mainstay of their diet was rice with a little palm oil. Many suffered from coincidental diseases such as yaws, chronic malaria, filariasis, schistosomiasis and dracontiasis:

Table II summarizes the individual degree of infestation of each case.

TABLE II.

Case	Parasite									
	E.h.	A.d.	T.t.	A.l.	E.c.	C.m.	T.h.	T.s.	S.s.	I.b.
1	+	+	+	-	-	-	-	-	-	-
2	-	-	+	-	-	-	-	-	-	-
3	-	+	-	+	+	+	+	-	-	-
4	+	-	-	+	-	-	-	-	-	-
5	-	+	+	-	-	-	-	+	-	-
6	+	+	-	-	+	+	-	+	-	-
7	-	+	-	+	+	-	-	-	+	-
8	-	+	-	-	-	-	-	-	-	-
9	-	+	+	+	-	-	-	-	-	-
10	-	+	-	-	-	+	-	-	+	-
11	-	+	-	-	-	-	-	-	+	-
12	+	+	-	-	-	-	-	-	-	-

Abbreviations :—

E.h. = *Entamæba histolytica*.A.d. = *Ankylostoma duodenale*.T.t. = *Trichuris trichiura*.A.l. = *Ascaris lumbricoides*.E.c. = *Entamæba coli*.C.m. = *Cheilomastix mesnili*.T.h. = *Trichomonas hominis*.T.s. = *Tænia saginata*.S.s. = *Strongyloides stercoralis*.I.b. = *Iodamæba büschlii*.

Summary.—The pharmacology of Phenothiazine, together with a method of treating multiple intestinal helminthic infestations with this drug, are discussed. There is evidence that the drug may be toxic to infants and children. Good results were obtained from using the drug for infestations with *Trichuris trichiura*, *Strongyloides stercoralis*, *Ankylostoma duodenale* and *Tænia saginata* in West African native troops. Its value in amœboid conditions seems doubtful.

My thanks are due to Colonel L. A. Harwood, *T.D.*, for permission to publish this article, and without the expert pathological reports rendered by Captain J. H. H. Keal, Royal Army Medical Corps, and the fine co-operation of my native ward orderly, Private J. McKewan, West African Army Medical Corps, this work would have been impossible. The supply of Phenothiazine used in the survey was kindly donated by its manufacturers, Imperial Chemical Industries, Ltd.

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BLACKWATER FEVER.

BY CAPTAIN W. K. FREWEN.

Royal Army Medical Corps.

AN account of two cases of blackwater fever that came under my care during the last six months may be of interest to those who are concerned with the disease. The second case is of particular interest in that the patient was suffering from enteric fever as well. It would appear that under favourable conditions the immediate prognosis of blackwater fever is good if adequate facilities are available for the treatment of the disease.

Case 1.—The patient was aged 19 and was in the Free French Forces. On admission to hospital he was apyrexial; a blood film had been taken at the Field Ambulance and was positive for B.T. malaria. It was the patient's first attack so far as he knew. On examination, the only positive finding was a palpable spleen and he was put on a course of quinine sulph. gr. x t.d.s. His condition remained satisfactory until about the fifth day of quinine therapy. In the early morning, on awakening, he suddenly had a rigor and his temperature shot up to 103° F. He was acutely mentally distressed and was obviously fully aware of the seriousness of his condition. He was extremely restless and kept on saying he was going to die. Nothing would convince him that he had any hope of living and his mental condition could be likened to the *angor animi* of angina pectoris.

On examination his pupils were dilated, his lips were cyanosed, the skin was hot and dry and he had a running weak pulse. He was extremely prostrated and complained of pain in his abdomen. His apex beat was $\frac{3}{4}$ inch

outside the nipple line. There was generalized tenderness all over the abdomen and especially in the epigastrium. Both his spleen and liver were easily palpable and tender on pressure. His urine was coffee coloured and, on spectroscopic examination, showed the characteristic bands of methæmoglobin; there was a heavy deposit in the specimen glass of debris, casts and epithelial cells. His hæmoglobin per cent was 38. The condition of the patient was critical and called for immediate and urgent treatment.

The foot of the bed was raised on blocks, hot turpentine stupes were applied to both loins and to the epigastrium and morphia gr. $\frac{1}{4}$ was given hypodermically; frequent tepid sponging was carried out with marked relief; the effect of morphia was dramatic as the acute mental disorientation was relieved immediately. The patient from then onwards co-operated well in the further treatment necessary. An alkaline mixture of soda bic. and soda cit. of each gr. 60 was given four-hourly by mouth until the urine became alkaline; one hour later, a 5 per cent glucose saline drip was started intravenously and, in a further two hours, 500 c.c. of citrated blood were added to the drip; the drip rate was kept at 40 to the minute. The general condition of the patient gradually improved. In eighteen hours, his urine was dark sherry colour; in twenty-six hours it was the colour of light sherry, and in thirty hours the urine was free of hæmoglobin and pale in colour. The drip was then discontinued but an alkaline mixture was given for a further three days. Atebrin 0.1 g. t.d.s. was started followed by a course of plasmoquin. The patient made an uninterrupted recovery and was discharged from hospital four weeks later.

Case 2.—The patient was aged 37 and was an Italian P.O.W. He had had two previous attacks of malaria before admission. He was apyrexial and his spleen was palpable. He was put on a course of quinine sulphate gr. x t.d.s. On the third day after admission his temperature suddenly rose to 102.4° F. and he perspired profusely. He became extremely aggressive and restless and resented the attention of those around him. He refused to answer questions and his whole attitude was antagonistic and sour. On examination his liver and spleen were easily palpable and he had some generalized rigidity of the abdomen. His urine was dark sherry colour with a moderate deposit. Free methæmoglobin was present.

He was treated as already illustrated in Case 1, with morphia, glucose and blood drips and massive alkalinization. He differed, however, in that he would not co-operate and he was extremely difficult to nurse. He was given morphia gr. $\frac{1}{6}$ t.d.s. for the first twenty-four hours in an attempt to quieten him. He spat out all the fluids by mouth, with the one exception of cocoa; his alkaline mixture was given four-hourly in cocoa, which he took readily.

His response to treatment was slow. In twenty-four hours his urine was light sherry colour; in thirty-six hours it was much the same, and in forty-eight hours it was free of hæmoglobin. His mental attitude changed completely with the disappearance of hæmoglobin from the urine. He was now quite complacent and willing to take all and everything that was offered him. He was given atebrin 0.1 g. t.d.s. for seven days and, although his general condition improved, his temperature did not respond. After a further three days of plasmoquin 0.1 g. t.d.s., a blood culture was done, as his pyrexia remained unabated. His liver was only just palpable but his spleen was still easily felt. The culture was positive for paratyphoid A, and he was removed to the isolation block. His further progress was satisfactory and he was discharged from hospital ten weeks later. The donor

in this case was a B.O.R., and there was no evidence to suggest that he had enteric fever or was an incubator of the disease.

CONCLUSIONS.

The points of interest resulting from the two cases illustrated may be enumerated as follows:—

(1) The occurrence of blackwater fever during a first attack and a chronic malaria.

(2) The value of good and energetic nursing.

(3) The value of immediate treatment and especially blood drips.

(4) The isolation of paratyphoid A from the blood of the second case. Might this not have some bearing on the ætiology of the disease or at least on the onset of blackwater fever in this case?

[The Consultant in Tropical Medicine, to whom this paper was submitted and who has forwarded it as being of great interest, adds the following:—

“ Personally I should hesitate to give plasmoquin to a patient who has recently suffered from blackwater fever since this drug may predispose to methæmoglobinæmia in susceptible individuals.”—EDITOR.]

Current Literature.

(i.) DULANEY (Anna Dean) & STRATMAN-THOMAS (Warren K.). **Complement Fixation in Human Malaria. I. Results obtained with Various Antigens.**—*Jl. Immunology*. 1940. Sept. Vol. 39. No. 3. pp. 247-255. With 1 fig.

(ii.) STRATMAN-THOMAS (Warren K.) & DULANEY (Anna Dean). **Complement Fixation in Human Malaria. II. Diagnostic Application.** *Ibid.* pp. 257-264.

(i) By means of an antigen prepared from *Plasmodium knowlesi* parasites collected by centrifugation from laked red blood corpuscles of infected monkeys complement fixation tests have been carried out. The parasites, washed free of hæmoglobin, are dried *in vacuo* and ground to powder in a mortar. For use 0.1 gramme of the powder is ground in a mortar with 10 c.c. of saline. The solution is then frozen and thawed four times with a dry ice-alcohol mixture. The liquid is then centrifuged, the supernatant fluid being standardized against known positive and negative malarial sera and tested for anticomplementary properties. Similar antigens have been prepared from *P. vivax* and *P. malariae*. With these antigens strong complement fixation was obtained with sera from cases of any of the three malarial infections. The reaction is thus a group rather than a specific one. Pre-existing syphilis has not been found to modify the reaction. A Wasser-

mann-negative patient may still give a negative Wassermann reaction at a time when malarial parasites are present in his blood and a 4+ malarial complement fixation has been obtained. Attempts to obtain cutaneous or precipitative reactions specific for malaria were not successful, nor did antigens prepared by other methods yield as definite results as the one employed.

(ii) In the second paper it is shown that complement fixation tests in malaria are very closely correlated with the presence of malarial parasites in the peripheral blood. A strongly positive reaction means the presence of parasites in the blood. A negative reaction cannot, however, be taken as a certain indication of the absence of parasites. With increase in the number of parasites in the blood the intensity of the reaction increases also. From the standpoint of diagnosis the reaction might be of value in *P. falciparum* infections when parasites, though present in the body, are absent from the peripheral blood.

C. M. WENYON.

Reprinted from the "Tropical Diseases Bulletin," Vol. 38, No. 7, 1941.

HARVEY (W. F.). Studies in Method and Standardisation of Blood Examination. VII. Blood Sedimentation Rate, Sedimentation Volume and Centrifuge Volume.—*Edinburgh Med. Jl.* 1941. Jan. Vol. 48. No. 1. pp. 14-25.

For these examinations the author uses common vaccine lymph tubes of 1 mm. bore, and points out that, within limits, the bore does not greatly influence the result, but that it is essential that the bore should be uniform throughout each tube. The tubes are thrown away after use so that elaborate cleaning is dispensed with. Blood from a finger prick is satisfactory.

Technical details are given: 4 drops of blood are diluted with 1 drop of 3.8 per cent citrate solution and this mixture is taken up into the tubes to a height of 5 cm. Sedimentation readings are taken at twenty minutes, one hour and twenty-four hours, and after this the tubes are centrifuged and the height of the column of packed cells is measured. It was found that there was a fairly constant relation between the height of the column of red cells after sedimentation for twenty-four hours and the height after centrifugation. The factor was 0.75 which, when multiplied by the former observation, gave value of the latter. But these readings, of course, are in blood diluted with citrate solution; for undiluted blood allowance for the citrate must be made. Nevertheless the author considers that when a centrifuge is not available, the height of the column of red cells after sedimentation for twenty-four hours, adjusted by these calculations, is a very useful substitute for the volume of packed red cells or for a red cell count. Dilution may be avoided by using dry powdered oxalate as anticoagulant. [The method may be most useful to workers in the tropics who find difficulty in obtaining laboratory services, or who have not enough practice to undertake with certainty the skilled operation of blood counting.]

C. W.

Reprinted from the "Tropical Diseases Bulletin," Vol. 38, No. 7, 1941.

MONTHLY BULL. EMERGENCY PUB. HEALTH LAB. SERVICE.¹ (Issued on behalf of Med. Res. Council.) 1942, Feb., 1-2. **A Water-Borne Outbreak of Paratyphoid B Fever.**

Though there are numerous classical examples of water-borne typhoid fever, well authenticated instances of water-borne paratyphoid fever must be very uncommon. The following account of such an outbreak from Northampton and Leicester is therefore of peculiar interest. It will be noted (a) that *Bact. paratyphosum B* was isolated from the water by three different laboratories, and (b) that the organisms were present in large numbers, being isolated on at least one occasion from as little as 0.1 ml.

"An outbreak of paratyphoid B fever which occurred in Brixworth in July, 1941, showed several features of unusual interest. The epidemiological information has been supplied by Dr. Jones, M.O.H., Brixworth Rural District, and by Dr. Godber, Regional Medical Officer. The laboratory investigations were carried out at Northampton and Leicester.

"On July 10, four cases of enteric fever were diagnosed in Brixworth. All four occurred in four separate households in a group of cottages known as Clark's Cottages, Church Street, Brixworth. The population at risk was 34. Four week-end visitors from London had gone home before the outbreak was discovered; all were followed up and investigated with negative results. Of the remaining inhabitants, twenty-one were found at one time or another to be excreting paratyphoid bacilli in the faeces, though not all at the first examination. Many of them can be classed as mild clinical cases, but many showed no symptoms at all.

"The only factor common to the inhabitants of Clark's Cottages and not shared by the rest of Brixworth was the water supply; in addition the very high percentage of cases among the population at risk and the fact that no cases occurred in the rest of Brixworth made the water strongly suspect from the start. Examination of the cottages showed the water supply to be highly unsatisfactory. The block consists of five cottages opening into an enclosed yard, which communicates by a narrow passage with Church Street. Three sides of the yard are occupied by cottages; on the fourth is a row of four hand-flushed water closets and two ash-pits, backing on to the boundary-wall of a farm garden, which lies at a rather higher level. In the centre is a courtyard which contains a pump, and two open sluice-drains used by all the houses in common. The floor of the yard is composed of bare earth, broken brick and stone and is pervious at all points. The pump draws from a well in a cellar underneath one of the cottages. The floor of the cellar is approximately 5 feet below the level of the yard. The well had not been open previously in living memory but the stone cover, when detached, revealed a narrow cavity approximately 2 feet 6 inches cube with a 2 feet depth of water standing in it. The volume of water was said to be about 25 gallons. If the well is pumped dry it re-fills in about an hour. The well

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itself is lined with brick in part and in part consists of the uncovered natural stone. Water is said to enter through fissures in this stone.

"The pump handle was chained and locked on July 16, and from July 11 all the inhabitants were advised to boil their water, though it is unlikely that all of them did this. A sample of well water taken on July 15 and examined at Northampton yielded a presumptive coliform count of over 1,800 per 100 ml., and *Bact. paratyphosum B* was isolated from the water.

"From samples collected on July 18 and sent to Oxford and Leicester *Bact. paratyphosum B* was isolated, in spite of a delay of three days before the specimens were received. Subsequent samples examined at Northampton and Leicester also gave positive results. The last sample in which *Bact. paratyphosum B* was isolated was collected on August 6, 1941. Several subsequent specimens gave negative results. Thus the water was known to be infective for a period of over three weeks. At Northampton and Leicester tetrathionate broth was used in all the examinations, and *Bact. paratyphosum B* was isolated without difficulty. Leicester used a specially inhibitory formula of tetrathionate broth which after eighteen to twenty-four hours' incubation gave on plating out on to selective media nearly pure cultures of *Bact. paratyphosum B*. From a sample collected on July 21 paratyphoid bacilli were found in as little as 0.1 ml., in nearly pure culture, by the methods used. A bacteriophage was also present in the water. The organism cultured from the water was predominantly in the group phase. It is interesting to note that the organisms isolated from the persons who drank it were also predominantly in the group phase, though in some specimens the type phase predominated. The agglutination reactions were also interesting; some high titres to *Salmonella* group suspension were found. In one patient the following result occurred: *typhosum* O 1/50, *typhosum* H negative, *paratyphosum B* O 1/500, *paratyphosum B* H 1/250 trace. *Salmonella* group 1/25,000.

"There can be no doubt that this was a water-borne outbreak of paratyphoid B fever. So far as is known *Bact. paratyphosum B* has not been previously isolated from a water supply. The original cause of the outbreak, however, is unknown. Fluorescin tests were performed on the yard privies with a negative result; contamination of the well might, however, have occurred either through the surface of the yard or from the open sluices in the middle. The farm, which lies at a higher level, was also investigated, but examinations of faeces, urine and blood from all its inhabitants were negative. There was nothing to suggest milk, synthetic cream or anything else as the primary source of infection. Investigations of the staffs of the dairy and bakery supplying the yard were negative. It is most probable that one of the inhabitants of the cottages contracted the disease in a mild form and then infected the others. As a result of the outbreak, main water from Northampton was brought to the cottages."

Reprinted from "Bulletin of Hygiene," Vol. 17, No. 5, 1942.

Review.

OUT OF WORKING HOURS: MEDICAL PSYCHOLOGY ON SPECIAL OCCASIONS.

By Henry Yellowlees, *O.B.E.*, *M.D.Glas.*, *F.R.F.P.S.Glas.*,
F.R.C.P.Edin., *F.R.C.P.Lond.*, *D.P.M.Lond.* London: J. & A.
Churchill, Ltd. 1943. Pp. viii + 152. Price 8s. 6d. net.

The publication of any book by Dr. Yellowlees is of special interest to Medical Officers of the R.A.M.C. since he was Consulting Psychiatrist with the British Expeditionary Force in France in 1940. Indeed, one of the eight lectures here reproduced was given to R.A.M.C. officers in 1940; it deals with anxiety states. This, however, is the only paper which is directly concerned with Military Psychiatry. The book is a collection of "occasional" lectures given to a wide variety of types of audience including Sister Tutors, Hygienists, Social Workers and Masseurs. It is thus in no sense a medical textbook but rather a collection of interesting and stimulating talks on various topics from the psychological point of view.

Once again Dr. Yellowlees demonstrates the qualities which have come to be expected by all those who have listened to his lectures or read previous books of his—his talent for understanding the point of view of a special audience, his skill in making helpful psychological comments on their work, and his power of making everything seem interesting. We welcome also once again his common sense, his graceful style and the usual generous ration of apt quotations from Shakespeare!

A third of the book is taken up with his two 1939 Morison lectures to the Royal College of Physicians in Edinburgh on "The Problems of Adolescence." The Harveian oration of the 150th Festival of the Edinburgh Harveian Society is also included.

The Morison lectures contain much that is wise and practical, though his line of reasoning sometimes seems a little muddled and his tilting against psycho-analysis old-fashioned in type.

EDWARD ARNOLD & Co., London, inform us that on February 4, 1943, they brought out a third edition of Sir Arthur Hurst's "Medical Diseases of War."

We hope to review a copy of the work in due course.

Correspondence.

CLINICAL OBSERVATIONS ON LOW BACK PAIN AS A CAUSE OF INCAPACITY AMONG SOLDIERS.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR.—In the issue of your Journal for December, 1942, Major McCollum described a test for use in low backache advised by Steindler and

Luck (*Journ. Amer. Med. Assoc.*, 1938, 110, 106). He states that the material used by these authors was 5 to 10 c.c. of a 1 per cent solution of percaïne hydrochloride. In making this statement he falls into a mistake which has on several occasions had tragic consequences. As a result the manufacturers of percaïne (Messrs. Ciba, of Horsham) have changed the name of their product to Nupercaïne despite the fact that Percaine is an older word than Procaine, the substance which was actually used by Steindler and Luck. Although in terms of therapeutic co-efficients Percaine is less toxic than Procaine, it is in terms of absolute toxicity many times more toxic. The minimal lethal dose of Percaine for guinea-pigs, cats and dogs is 25 mgm. per kilogramme whereas that of Procaine is 700 mgm., 550 mgm., and 525 mgm. per kilogramme respectively.

Very large doses of Percaine have occasionally been injected without tragic consequences but deaths have been recorded with a total dosage of as little as 520 mgm. Using the method advocated by Major McCollum in a patient with a number of tender spots a fatal dose might well be given. The dose of Nupercaïne to be given should read 5 to 10 c.c. of a 0·1 per cent solution.

Quaker Barn, Whitchurch,
Nr. Aylesbury, Bucks.

February 8, 1943.

Yours faithfully,
RAYMOND GREENE.

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Recently Cormia reported for instance, that 5 of 7 patients with arsphenamine dermatitis were able to tolerate more of the arsenical without further reaction after receiving massive doses of vitamin C (500 mg.) by injection, followed by high maintenance doses by mouth. The usual doses given for a comparatively short period of time do not reduce the therapeutic effect of the arsphenamine.

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JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS

Corps News.

MARCH, 1943.

EXTRACTS FROM THE "LONDON GAZETTE."

February 25, 1943.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the Middle East:—

The Military Cross.

Royal Army Medical Corps.

Capt. Stephen Martin Patrick Conway (127184).

Capt. Donald Macrae, M.B. (199422) (Stornoway).

Capt. James Jack McCall, M.B. (152551) (Bearsden, Glasgow).

Capt. Peter Urwin (99270) (Yeovil).

March 9.—The KING has been graciously pleased to give orders for the following appointment to the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in Burma:—

To be Additional Officer of the Military Division of the said Most Excellent Order:—

Capt. Edmund MacLaine, M.B. (173463), Royal Army Medical Corps (Port Ballintrae, Co. Antrim).

March 11.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the Middle East:—

The Military Cross.

Capt. Oliver Ivan Green (99404), Royal Army Medical Corps (London, S.W.1).

Capt. Esmond Douglas Vere Nicoll (171194), Royal Army Medical Corps (Mill Hill, N.W.7).

February 12.—Major (temp. Lt.-Col.) M. C. Paterson, M.C., M.B. (10314) is restd. to estab. July 3, 1942.

February 26.—The undermentioned short service officers are apptd. to permanent commns. retaining their present seniority:—

Jan. 1, 1943.—Capt. G. H. H. Dunkerton, M.B. (73561).

Capt. J. C. Lambkin, M.B. (73562).

Feb. 1, 1943.—Capt. D. Matheson, M.B. (73578).

Capt. T. G. S. James, M.B. (74437).

Feb. 16, 1943.—Capt. (temp. Major) J. C. Watts, M.B. (74438).

Memoranda.—The undermentioned Consultants are granted the local rank of Brig. Sept. 15, 1942:—

Temp. Col. J. Biggam, M.C., M.B. (5079).

Temp. Col. D. Fettes, O.B.E., M.B., F.R.C.S. Edin. (15746).

Temp. Col. F. M. Lipscomb, M.R.C.P. (12480).

March 9.—Col. J. G. Gill, D.S.O., O.B.E., M.C., M.B. (8368), to be a D.M.S., and is granted the paid actg. rank of Major-Gen., Oct. 6, 1942.

Major (War Subs. Lt.-Col.) (temp. Col.) W. J. F. Craig, M.B. (8612) to be Lt.-Col., March 8, 1943.

Lt.-Col. L. B. Clarke (15665) having attained the age for retirement, is retained on the active list supernr. to estab., March 8, 1943.

Capt. W. F. L. Fava, M.D. (56531), to be Major, March 6, 1943.

CHELTENHAM COLLEGE.

ENTRANCE SCHOLARSHIPS, 1943.

There will be awarded as a result of an examination to be held in May, 1943:

- (a) Not more than 10 open scholarships and exhibitions, value £30 to £80 per annum.
- (b) One R.A.M.C. scholarship, value £50 per annum.
- (c) Two "Old Cheltonian" exhibitions, value £20 per annum. These

may be held in conjunction with, an open award.

- (d) Three Firth Brown studentships, tenable at Cheltenham College, value £20 per annum offered by Messrs. Firth & John Brown, Ltd., to candidates intending to become engineers.

Full particulars may be obtained from the Headmaster, Cheltenham College.

PRISONERS OF WAR AND MISSING.

Prisoners of War.

T/Brig. Stringer, C. H., Malaya.
A/Col. Bennet, J., Malaya.
Lt./Col. Collins, J. C., Malaya.
T/Major King, A. C., Netherlands
E.I.
T/Major Prosser, O. G., W. Desert.
Capt. Bailey, A. J., Netherlands E.I.
Capt. Cayley, F. E. de W., Malaya.
Capt. Daniels, F. L. K., Netherlands
E.I.
Capt. Dickson, M. C., Malaya.
Capt. Hewat, J. K., Malaya.

Capt. Mark, J. A., Malaya.
Capt. Welsh, R. B. C., Malaya.
Lt. Ross, C. C., Malaya.

Missing.

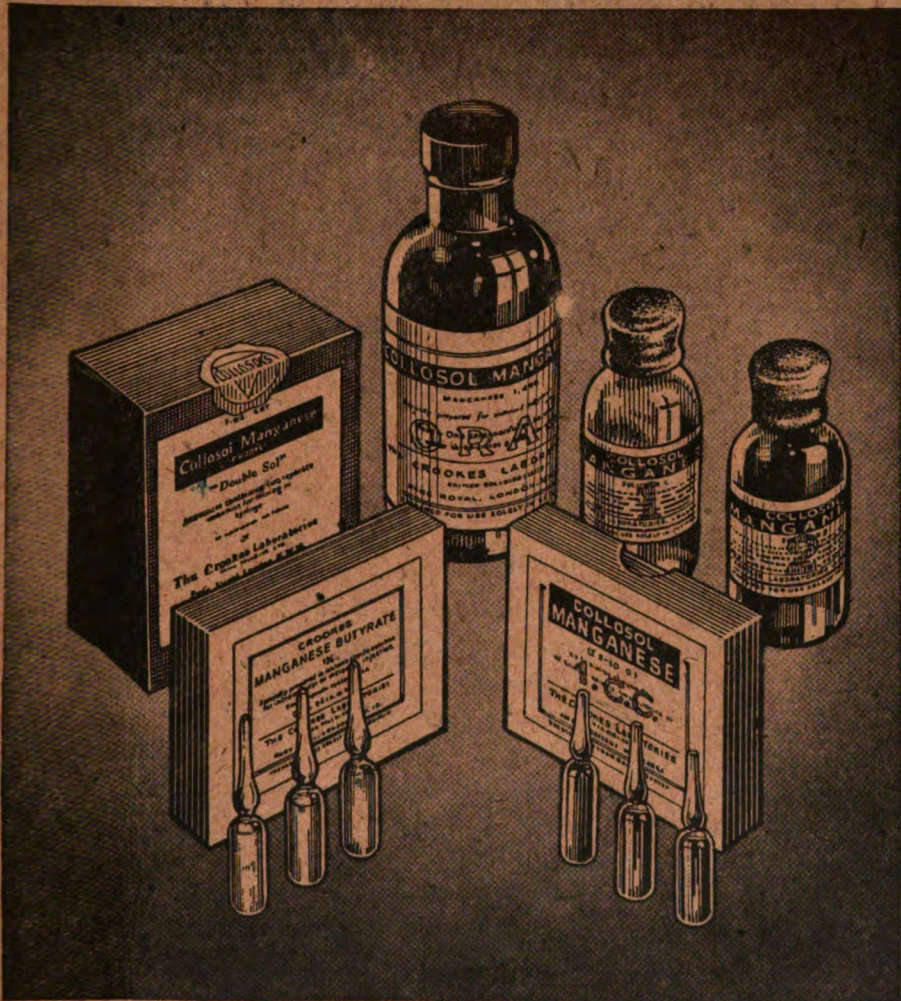
A/Lt.-Col. Maisey, C. W.
T/Major Bentall, S. W. T.
T/Major Beadnell, H. M. S. C.
A/Major Kilgour, H. McP.
Capt. Berkeley, A.
Capt. Goronwy, J. W.
Capt. Manning, J. C.
Capt. Wallace, W. P.

DEATHS.

MYLES.—In India on Nov. 3, 1942, Capt. Thomas Picton Myles, M.B., R.A.M.C. Son of Col. C. D. Myles, *O.B.E.*, late R.A.M.C., retired. He was born June 12, 1912. He took the M.B. Cantab. in 1937 and the D.O.M.S. England in 1939. Having held house appointments in Sheffield Royal Infirmary and St. James's Hospital, Balham, he entered the R.A.M.C. Sept. 1, 1937, and was promoted Capt. Jan. 1, 1939. He served in France 1939-1940.

ARCHER.—In Godalming on Jan. 9, 1943, Col. Samuel Arthur Archer, *C.M.G.*, late R.A.M.C., retired. Son of Col. Archer, late R.A.M.C., he was born in Athlone April 22, 1871. Commissioned

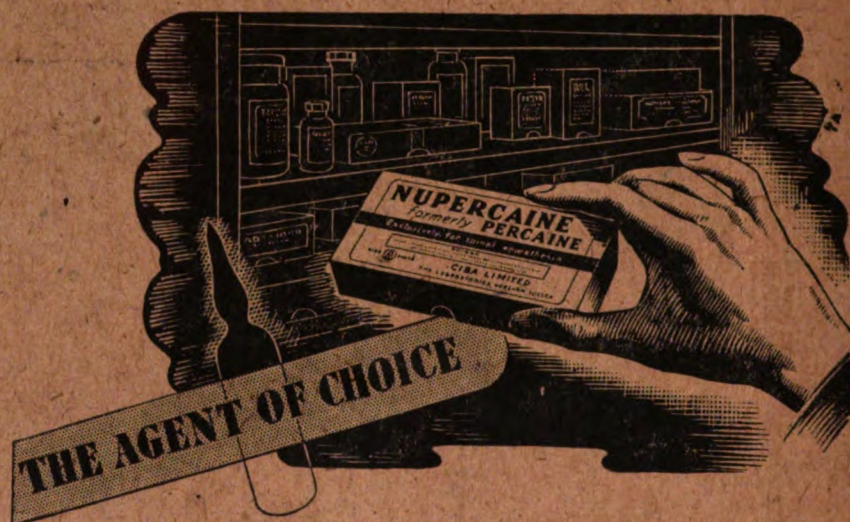
Surgeon Lieutenant July 29, 1896, he was promoted Captain R.A.M.C. July 29, 1899, Major Jan. 29, 1908, Lieutenant-Colonel March 1, 1915, and Colonel Oct. 23, 1918. He retired on account of ill-health March 23, 1921. He took part in the Nile Campaign of 1898 receiving the Medal and Egyptian Medal. He served in France from Oct., 1914, till Nov., 1917, when he went to Italy where he served till 1919. He took part in the first battle of Ypres and the battles of Festubert and Neuve Chapelle. He was present at the battle of Papulopole and the crossing of the Piave. Thrice mentioned he was created *C.M.G.*, and awarded the Italian War Cross, the 1914 Star, British War and Victory Medals.



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Brit. J. Surg., 1941, 29, 168.

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No. 4.

April, 1943.

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OF

THE



Royal Army Medical Corps

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MONTHLY

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LIEUTENANT-COLONEL A. E. CAMPBELL, R.A.M.C.

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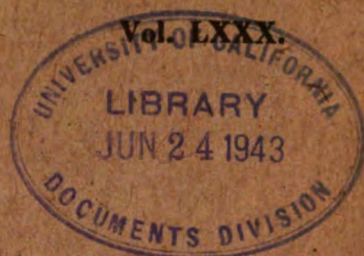
LIEUTENANT-COLONEL C. A. WHITFIELD, R.A.M.C.

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Journal of the Royal Army Medical Corps.

Original Communications.

REHABILITATION.

BY LIEUTENANT-COLONEL STANLEY D. LARGE, D.S.O., M.C.,
Officer Commanding Convalescent Depot.

(Continued from p. 123.)

PREMISES are a basal consideration and the following data are based throughout upon a Convalescent Depot for 1,000 trainees.

It is obvious that the soldier's training is best conducted in a military setting and that the camp should be a model of Army smartness and cleanliness. But there is no reason why it should not be so chosen and developed as also to conform to æsthetic standards which react so favourably upon the susceptible's sense of well-being and "worth-while." Experience suggests that huts are preferable to both houses and tents; that the site should be on the outskirts of a town affording leisure-hour interests and diversions; that it should be—or be made by its occupants—a place of beauty affording them both pleasure and pride. In this respect it is amazing to see what can be achieved, and how rapidly, by men—under good leadership—working so zealously as not to realize that scenic gardening is an organized part of their rehabilitation. The ideal locus is an estate of some 50 acres with an old mansion as an administrative block; with a hard surfaced parade-ground and playing fields; with cultivable areas to supply table needs; and with room for a scenic garden with a lake to serve as a swimming-pool also. This would provide the following necessities—still on the 1,000 trainee basis:—

Central Administrative Block.

With offices, stores and staff quarters in or around the old mansion.

Training Area, comprising:—

Parade-ground—100 yards square; level; better central and flanked by gymnasium.

Gymnasium—100 × 40 feet; with wall-bars, climbing ropes, balance beams, a box horse, coir (or sponge rubber) mats, horizontal bars, etc.; and with showers and dressing-rooms attached.

Drill-shed—150 × 30 feet; flanking parade-ground; essential if rainy.

Swimming-bath (or pool)—100 × 30 feet.

Sports field—of area to take 2 football and two basket-ball pitches as the minimum.

Assault course—of such importance that it is dealt with in detail in a following section on training.

*Remedial gymnasium*¹—a vital necessity, 50 × 30 feet.

*Physiotherapy department*²—40 × 30 feet beside the remedial gymnasium.

Living Area, providing:—

Dormitory huts—each taking a group of 24 men; 10 taking a company; 44 housing 1,000, with 2 spares for emergency needs. Each group has its separate lavatories but it is better to have only one bath-house for the whole camp.

Kitchens and dining-rooms—2, each dining-room to seat 500.

Recreation hut—serves as canteen during the day.

Games hut—for indoor games.

Reading hut—housing the library.

Reception station for minor sick—as little in evidence as possible but providing the essentials for out-patient casualties and suspect infections—for which 10 beds suffice.

STAFF PER 1,000 TRAINEES, AS DESIRABLE BUT NOT YET OFFICIALLY
AUTHORIZED.

Officers.

Commanding Officer—a senior officer from the Royal Army Medical Corps.

¹ The remedial gymnasium serves the 20 per cent. of cases who need special, individual attention. It must be well equipped (*vide* Appendix) and in charge of a specially-trained, resourceful instructor of outstanding personality and endless patience in the task of mobilizing stiff and painful joints. One M.O. should be constantly supervising the work and encouraging the case. The importance of this remedial factor cannot be over-estimated: a short account of its equipment—much of which can be improvised for special cases—is therefore given in Appendix II.

² The physiotherapy department is so situated that men can go direct from massage or heat treatment to do their special exercises. It should be staffed by well-trained masseurs—with the C.S.M.M.G. qualification—in the proportion of 1 per 20 daily treatments. As many medical cases also benefit from this treatment the average number of daily treatments may be taken as about 100. Appendix III gives a list of the infra-red, heat, ultra-violet ray and electric current apparatus required.

*Medical Officers.*¹—1 per grade of trainee equals 4, with 1 for routine.

Dental Officer—at least one is necessary.

Administrative Officers—as enumerated below, are all necessary and should be capable, versed in their own work, accustomed to control of men and ready to lend a hand as and when required—especially re social and recreational activities. Four Company Officers, 1 Adjutant, 1 Quartermaster, 1 Specialist Messing Officer (most valuable) and 1 Pay Officer, making a total of 8.

Other Ranks.

Remarks under this heading may advisedly be restricted thus:—

Serjeant-Majors.—Should be of attractive personality, excellent disciplinarians and actively athletic. They must have at heart the interests of the depot and particularly the *esprit de corps* of their company. One per company (4) and 1 Regimental Serjeant-Major, a total of 5.

*P.T. Instructors.*²—One is needed per 100 trainees.

Masseurs.—Hold the C.S.M.M.G. certificate and work in the physiotherapy department under supervision of a Medical Officer. As each can do some 20 treatments a day a staff of 5 should suffice.

A.T.S.—Are now replacing men as much as possible in such posts as cooks, store-keepers and clerks and it is interesting to note that in one depot the change from men cooks to A.T.S. cooks proved a very great success. At first they were regarded with suspicion, but it was soon found that they were not only better cooks but did the work in half the time with half the numbers and with much less fuss, noise and untidiness.

ROUTINE must needs be based upon the essentials that depot life must be attractive and so organized that it runs with efficient precision in an atmosphere of keen discipline maintained by all in the general interest. Inertia and slackness cannot survive when the days are filled with active training and organized games and the evenings are given over to cheery entertainment to suit all healthy tastes. In the well-willed, such a well-filled life creates an alert contentment of mind to balance the increased vigour which is an actual joy to the active body. The depot in which there

¹ *Medical Officers.*—If of age 30 to 40, they should have the essential energy, experienced common sense and capacity to handle men. They should be changed as seldom as possible, for—owing to their special knowledge—they are the stable pillars of success.

² *P.T. Instructors.*—They must be most carefully selected and trained in remedial gymnastics; highly intelligent and of very attractive dynamic personality. Their force of character and capacity for leadership are far more important than their special training for, if they have the right personality—and most of them have—they are worth their weight in gold; the ideal man will have his class full of enthusiasm, dashing about, laughing as they work most strenuously without realizing that what seems exhilarating play is part of an exacting programme. They all know their work from A to Z; they have to exercise all their wit and wiles to get the best out of men who are not quite fit and have become slack; and as a rule they succeed so well that the trainees have such liking and admiration for them as to go all-out in response to their every appeal. One of the most popular instructors it has been my good fortune to have under my command was a first-class professional footballer whom they nearly worshipped. All are Army Physical Training Corps-instructors, picked men from a selected corps.

is failure to perceive and preach and practise that gospel is unlikely to be a success. Whatever other work is done—and however disguised—there should be frank recognition by all that the core of each day's effort is—an hour of P.T.

But physical development will be slowed and ill-balanced if the mind be not also expanded by stimulus and exercise. It is also certain that active exercise of body and brain cannot be continued at high pressure unless good nutrition be assured by excellent, well-cooked and well-served food. And, finally, it is obvious that such strenuous efforts cannot yield their best results unless there be adequate spells of rest by day and sleep at night. Rehabilitation thus rests upon the four corner-stones of bodily effort, mental exercise, meals and rest. While each affords an alluring theme for a separate chapter, it suffices here to note that these essentials may be utilized as the bases of a daily, general time-table which allows for progressive increase in the intensity of physical effort until the trainee becomes once more a soldier—and, we hope, a more perfect soldier—on passing the final, exacting tests to be presently described.

TYPICAL DAILY TIME-TABLE IN USE.

06.30	Reveille	12.15/12.45	Interval	
07.30	Breakfast	12.45/14.15	Dinner and rest	
08.30	Company Parade	14.15/15.15	Education	
09.00	C.O.'s Parade	15.15/16.30	Organized games, or	route-march
09.15/10.30	P.T.			twice weekly
10.30/11.00	Interval	16.30	Tea	
11.00/12.15	Fatigues or light work	19.00	Supper	Recreation
		23.00	Roll-call	
		23.00/06.30	Sleep	
		Education	...	1
		Physical exercises	...	4½
Hours per day		Meals and intervals	...	5½
		Recreation	...	5½
		Sleep	...	7½
				<hr/> 24

Three items of routine, as distinct from training, call for special note.

Feeding—closely concerns psychological as well as physical reactions; the badly-fed man becomes so disgruntled that his training flags, and so discontented that his discipline and morale deteriorate. Consistently bad messing and cooking are unnecessary, uneconomic and inexcusable.

Entertainment has established its claim to be deemed a necessity demanding close attention and well-camouflaged organization. To counter the demoralization of idleness, every effort should be made to fill the leisure evening hours with pleasant and stimulating entertainment—such as dancing, concerts, cinema shows, whist-drives or popular lectures. Dancing—always popular—also gives exhilarating exercise, which is of special value for men with leg injuries. It is a revelation to see men who have limped about all day with limbs too stiff and painful to exercise in the gymnasium vying with the most active rival on the dance-floor in the evening. In one depot a normal week's entertainments on successive nights may run thus

—a gramophone recital, a concert party from outside, a cinema show, a dance, “Housey-housey,” and end with another dance. But although there is some entertainment every night of the week the men are at liberty to go into the town and amuse themselves as they like, from 17.00 to 23.00 daily and from 13.00 to 23.00 on Sundays.

Education—perhaps more than anything else—illustrates the Victorian fallacy that, in training, it is advisable to make all that is necessary also nauseating. An hour daily is devoted to efforts to satisfy or stimulate the citizen's desire to know his country's present needs and triumphs and the world's hopes for the future. That hour might be well-filled by an almost limitless variety of means to make such education as interesting as valuable. Illustratively one might mention the day's news, war strategy, a brains-trust (elected), applied science, nature problems, debates on ten-minute papers.

TRAINING AND TESTING.

Training.

The C.O. of a Convalescent Depot is happy in having a war-time objective as to which no dubiety is possible and hence no discussion is profitable. It is to get convalescents physically and psychologically fit for active service. But he is less happy in the human material entrusted to him for that purpose and the utmost value may attach to discussion of the means to that end and the pooling of practical experience of the process.

Material.—It is only when new arrivals parade in shorts and gym shoes—their working dress—that their defective physical quality becomes fully apparent. The few who are well-built and have a good carriage stand out conspicuously. They form less than 10 per cent of a mass of human material so poor that the inexperienced might well despair of salvaging from it many reinforcements for which any front-line C.O. would be grateful. A second disconcerting discovery is made when their movements are watched: even in quite simple exercises many reveal a general stiffness and awkwardness while most lack both agility and grace. But there is nothing wrong with their spirit: they are willing and eager to learn. It is just that their development has been badly neglected: they have never—not even in the military and/or auxiliary hospitals through which they have passed—been taught the physical training which would have so reduced their stay for rehabilitation in a C.D. There is obvious need—in civilian as well as military interests—for a radical increase of physical training at school and its extension into convalescence. The urgent problem which faces us at present is, however, to get this eager but impaired human material back into the Army in good fettle. That brings us to a third important fact. It is that—although convalescing from so wide a variety of causes as injury and functional, infective or degenerative illness—most of them still suffer, however unconsciously, from the complex of being an unfit incubus at the base instead of a fit soldier in the field. That leads to two very practical conclusions: (a) that this complex must be eliminated forthwith, and (b) that

the primary essential for natural cure is an atmosphere of good-will and good-cheer in which self-effort can create self-confidence. As those factors enable the bulk of such cases as are capable of becoming fighting-fit to do so happily as well as rapidly they are vital to rehabilitation in a C.D. It may perhaps be noted that if results useful in civil life occur incidentally so much the better—provided that they neither lessen nor retard military rehabilitation, for which the C.D. exists.

Means and Methods.—Amongst means available, perhaps priority should be given to production of the atmosphere mentioned in the preceding paragraph. That will be assured as and when each trainee finds that some member of the staff has a friendly, personal interest in him and his condition, for that assurance creates responsive readiness to tackle with zeal the exercises necessary to attain physical fitness.

Next in order of importance comes the physical training which must be made the core of the daily routine. It is designed to exercise all muscles: to increase mobility, agility, strength and endurance; and to promote that sense of physical and mental well-being which only the physically fit enjoy. Added zest is provided by the spur of competition—as between individuals, groups and companies—while ennui is prevented by the utmost profitable use of games and of variety such as is provided by swimming or even dancing. For P.T. twenty-four is regarded as the optimum number of trainees in a section, as large enough to provide the desirable stimulus of numbers in competition without being so large as to make it impossible for an instructor to give every individual the personal attention needed in a course so intensive as to be completed in from four to six weeks.

While this subject is too vast to be dealt with adequately in an article a few notes on some specific means may be welcome to some whose experience has yet to be gained. It is perhaps best to commence with the necessary daily time-table and then take some of its components *seriatim*.

The *physical training tables* are constructed in a sequence to suit the progress of rehabilitation through the four grades mentioned—from the newly-arrived weakling in Grade I to the matured warrior in Grade IV. There being three groups in each grade, a dozen such tables are required. These must not only be most carefully thought out individually, but be so “staggered” and dovetailed as to give every trainee a complete, progressive training and make the fullest possible use of both premises and instructors. One such table is given, illustratively, in Appendix V. It is based upon Army P.T. Tables and compiled from the following sources:—

- (a) Games and Sports in the Army, 1943.
- (b) Physical and Recreational Training, 1941.
- (c) Small-side Team games and Tabloid Sports (Army Sports Control Board).
- (d) Recreation and Physical Fitness, Youths and Men (Board of Education Physical Training Series, No. 15).
- (e) Purposeful and Basic Physical Training, 1942.

In general the object of such tables is to provide a scheme for an hour's P.T. devoted to certain purposes and stages thus:—

- (a) Seven minutes of warming-up and loosening exercises,
- (b) Twenty minutes on exercises to increase strength and endurance,
- (c) Twenty-five minutes' development of agility and dexterity,
- (d) Eight minutes cooling-off while practising marching and correct stance.

The latter tables gradually lead up to the more arduous and realistic training of route marches, cross-country runs and finally the "assault course" which is so important as to call for some detailed account (*infra*).

Apart from P.T., the employments of the day should be so varied and interesting as to be almost recreational but the hours should be so well filled as to form a mosaic with few interstices wide enough to afford a stance to the grouser. In dry weather the training is carried out on the parade ground but on wet days in the gymnasium and drill-shed—the latter of which must therefore be of adequate size.

Of the organized games little need be said. Football, hockey, tenni-quits, basket-ball, etc., are played on the sports-ground—of dimensions noted above. One most popular and valuable variant is "mass football" which is played by any number up to 50 or 60 a side—with half-a-dozen balls, one goal at each end and no rules. Special strengthening is assisted by tugs-of-war, one amusing variety being provided by four teams pulling on two ropes joined at the middle. Swimming is invaluable, especially water-polo and, if a swimming bath cannot be provided, the men should make their own swimming-pool.

Cross-country runs are given once a week for the three higher grades, the length increasing from 2 miles for Grade 2 to 6 miles for Grade 4. It is usually possible to mark out a suitable course of $1\frac{1}{2}$ miles on the periphery of the Convalescent Depot. Route marches are given once weekly to all save Grade 1; the length is increased from 3 miles for Grade 2 to 12 for Grade 4, and the load is gradually raised to that of the marching infantryman.

Throughout, the spirit of competition is fostered in every possible way and not only by games. In assessing company priority, marks are given for smartness on parade and on the march, for tidiness and cleanliness of company huts and for beautification of the company area. To encourage this spirit of competition and *esprit de corps*, a cup is presented to the winning company every month, and the winning company's flag is flown on the parade ground flagstaff. The keenness of competition is most valuable and gratifying.

The *Parade Ground* calls for special mention in the conclusion of this section. Its size may seem excessive to the uninitiated but it is one of the most useful and most used features of Convalescent Depots fortunate enough to have one. It serves for all daily parades and drills, for hockey,

basket-ball and sometimes football and, in fine weather, for physical training.

It is an inspiring sight on a fine day to see drill going on on one part of the parade-ground and group physical training activities of several different kinds on others, the groups changing from one kind of activity to another on the blowing of a whistle.

One group may be learning the correct way to pull on a tug-of-war rope tied to a large tree, some groups on exercises with heavy logs, other groups learning the correct way to lift, carry and set down heavy weights, one group learning unarmed combat, another doing high jumping and so on.

There is an air of purposeful activity about the scene which stimulates the imagination of both participants and onlookers.

Testing.

In each grade every man must pass definite standard tests before he is promoted to a higher grade. Regrading occurs weekly, as noted (*supra*).

In Grade 1, the tests are based upon the man's general response to P.T.

In Grade 2, in addition to having given satisfaction to his P.T. instructors, tests are based upon his completing the cross-country run and route march in reasonable time and without falling out or being distressed.

In Grade 3, the tests are based upon the longer weekly cross-country run and route march, which he must complete to the instructor's satisfaction.

In Grade 4, besides being tested on cross-country runs and route marches as noted, the man must be able to go around the assault-course at the double and surmount all its obstacles with ease. When fit to pass out of this grade he is fit to join any unit—no matter how well trained it may be.

That brings us to a description of the assault course which thus plays so important a part in determining the efficiency of the training as well as the final fitness of those who have passed through it.

The Assault Course of one Convalescent Depot is thus described:

"This lies on undulating rough parkland studded with large trees and covered with bracken. Various obstacles to test strength, agility, stamina and nerve have been placed at intervals throughout the area and the men go over the course in groups of 6 or 8. The obstacles are comprised as follows:—

(1) The men start from a trench; run 50 yards uphill to a belt of barbed wire, through zig-zag lanes in which they thread their way; leap over a 6-foot-wide trench twenty yards further on and throw themselves down behind a bank.

(2) When all have arrived, they leap up and run to an 8-feet-high embankment in front of which a deep pit 8 yards wide has been dug. From the limb of a large tree overhanging the pit two ropes are suspended and the first two men clamber down into the pit and pass the ropes up to the next two waiting on the bank. These grasp the ropes as high as they can, tuck

up their knees and swing across the pit, not letting the ropes go when they land. When they are steady they swing the ropes back across the pit to the next two, and so on.

(3) After crossing the pit the group collects again, runs downhill to a second deep and wide pit which the men cross either by running along a springy plank or by sliding their feet along one loose wire while they hold on to another wire above their heads. Neither way is very easy.

(4) Is a 10-feet-high brick wall which they surmount as taught, i.e. the first man faces the wall with legs braced and hands upstretched. The next two grasp him by the feet and heave him up. He catches the top of the wall, pulls himself up and drops over. The third last man remains on top of the wall to help the last two over. The last man stands with his back to the wall and locks his hands. The second last man faces the wall, steps into the last man's locked hands and is heaved up to the top where he lies over beside the third last man. These two then lock their own hands and the last man leaps up and with each hand grasps a pair of locked hands and is pulled to the top, when all three drop on the other side.

(5) Consists in climbing an inclined rope to a 12-feet-high limb of a tree; transferring by a horizontal rope therefrom to another tree 10 yards away; and then sliding down a third rope to the ground. This is quite difficult and calls for both strength and stamina.

(6) Includes an easy leap over a brushwood fence; a run up a ramp to a rail and a leap thence over another rail supposed to be "live" so that the leap must clear it.

(7) Is another run uphill to a trench, six yards in front of which is a house-front with window frames in position. The men lob dummy hand grenades through the windows; climb out of the trench; clamber over a fence; jump another trench and climb through the windows of the 'house.'

(8) There follows a crawl along narrow, barbed-wire tunnels 18 inches high. The crawl has to be done with the elbows and toes (not hands and knees) to avoid being scratched by the barbed wire "roof." Then comes a run down hill, a double jump over two trenches from above and a run uphill to the last obstacle.

(9) The last obstacle is a long aerial glide down a wire cable stretched from high up on one tree to high up on another 100 yards further down the slope. A pulley-wheel with a handle runs on the wire—the man mounts a ladder to a platform on the first tree; grasps the handle; steps into space; and sails away at a good speed. The wire sags a little and when the man is about three-quarters of the way down and his feet are about 6 feet from the ground, he can either jump off there at speed into soft earth and do a forward roll when he lands or he can go on to the end at a lessening speed and fend himself off with his raised feet when he reaches the tree. This obstacle tests the nerve more than any of the others."

RESULTS AND PROSPECTS.

RESULTS may be considered under two headings: (1) Psychological, (2) Physical.

Psychological.—Every detail of life in the Convalescent Depot is carefully planned to create an atmosphere of happy efficiency, vigour, and manliness and, as the individual instinctively tends to adapt himself to his environment, a period of four to six weeks in such an atmosphere invariably produces a marked improvement in morale. In fact the change for the better in the average newcomer during the first forty-eight hours is both striking and gratifying. As his outlook on life grows brighter he enters into the spirit of the place and begins to carry out his training with zest and enjoyment, taking a pride in his own person and in his surroundings and thinking less and less of his disability until by the time he leaves he feels—and is—a fit and a new man physically and mentally. The obvious pleasure with which the various groups do their exercises and their delight in going over the assault course give one an easy mind about the tone of their morale. They thoroughly enjoy their stay in the depot and, although they are naturally anxious to get back to their units, when the time comes for them to leave they do so with regret.

Physical.—Four weeks' steady physical training arranged by experts and designed not only to overcome any residual local disability but to tone up all the muscles of the body is bound to—and does—do good, and gives the men more speed, strength and stamina than they had before. In fact it is quite often possible as a result of the training to raise a man's medical category above that which he had with his unit. The pitch of physical fitness reached may be shown by the fact that recently a group of commandos who came to practise on a C.D. assault course* were challenged to a contest by a group of Grade IV trainees—and beaten.

With the orthopædic cases the patient and painstaking individual attention given in the early stages and the group activities later produce results which are invariably good. It is not uncommon for surgeons who know the depot to send a man with a doubtful knee to be tried out on the assault course and cross-country runs; if it does not give way under this trial it does not require operation. When it is remembered that of the 10,000 cases which pass through a 1,000-bedded Convalescent Depot in a year, 85 per cent are returned to their units in category A, 11 per cent in category B and 4 per cent in category C, and all of them at least as fit as before they entered hospital, it will be appreciated that the C.D. fulfils a most useful function in the conservation of man-power.

PROSPECTS.—Were there no such units as Convalescent Depots there would be a great wastage of man-power. As it is, 300,000 man-days per year are spent in each 1,000-bedded C.D. in the final stage of rehabilitation. If the earlier stages in hospital and auxiliary hospital were carried out as universally as they should be, an appreciable saving could be effected in this enormous figure but, until the necessary personnel are made available and

trained, and every large hospital has its rehabilitation medical officer and P.T. instructor, there is not likely to be much improvement.

If only a system of rehabilitation on Army lines were introduced into civil life it would do incalculable good. The saving to the sick or injured individual in suffering, misery, and prolonged—if not permanent—disablement, would be enormous. The saving to the State in man-power and in money paid in compensation would be beyond computation. Such a system should not present insuperable difficulties in organization. Experience gained in the Army has been so extensive and so universally good that the projected civilian scheme might well follow the same lines. The smallest Convalescent Depot in the Army has 250 beds, the largest over 2,000, and in them all the cases are mixed. I have no doubt whatever that it is better, both in the Army and in civil life, to have very large units with mixed medical and surgical cases rather than to have a host of small units confined to members of one trade all suffering from the same complaint. The large unit is more economical, easier to administer and more efficient, while the mixing of cases prevents the individual from dwelling on his own particular form of disablement. At present trained medical men and P.T. instructors are not available in sufficient numbers for such a scheme to be started in civil life, even on a small scale. It is most strongly urged that consideration be given to training them now, so that there will be a sufficient number of trained personnel for use after the war.

It is earnestly hoped that the lessons relearned in this war of the great value of rehabilitation treatment in returning the unfit individual to work, fully recovered, in the shortest possible time, may not be relegated to the same oblivion as the same lessons learned in the last war.

Fortunately the Ministry of Health is fully alive to the need and is now making wide scale and far reaching efforts and plans to establish rehabilitation for civilians throughout the country.

For much wise advice and material help in compiling this article I am deeply indebted to Colonel P. S. Lëlean, C.B., C.M.G., Professor of Public Health, University of Edinburgh.

APPENDICES.

APPENDIX I.

HERNIA EXERCISES PRACTISED AT A MILITARY HOSPITAL.

(1) *Rectus abdominis*.—Lying on the back, draw the knees up, sliding the feet along the bed; as a progression of this exercise the feet can be lifted off the bed for a moment when the knees are fully bent. Further progression should be made by lifting the feet from the bed with the knees *less* bent until finally it becomes a straight leg raising to vertical. This should take from three to four weeks, the time depending entirely on the individual strength of the patient.

(2) *Obliquus externus and obliquus internus*.—Lying on the back, knees fully bent, grasping the sides of the bed. Roll the knees to left and right

as far as they will go without discomfort, keeping the shoulders flat on the bed. Progressed by lifting the feet off the bed before starting the exercise. Further progression made by performing the exercise with the legs straighter until finally they are quite straight.

(3) *Transversalis*.—Lying on the back. Deep inhalation followed by full exhalation. When the lungs are empty contract the abdominal wall and pull it in as far as possible. A few normal breaths should be taken between each repetition.

These exercises should be performed before the operation if possible in order to teach the patient the movements. They should be started again a few days after operation. The number of repetitions will depend on the individual but experience has shown that six times for each exercise is usual. The whole group should be done four times a day and continued after the patient is out of bed.

Further abdominal exercises will be found in the Official Army Pamphlet on Remedial Exercises—"Physical Medicine Remedial Exercises for the use of A.P.T.C. Instructors." 1943.

APPENDIX II.

THE REMEDIAL GYMNASIUM EQUIPMENT.

- (1) *Ankle Rockers*.—Made by nailing a cylindrical stick (sizes varying from 1 inch to 3 inches in diameter) to the centre of the under side of a board 6 inches by 12 inches. When the man stands with his foot on the board and rocks it backwards and forward it gives flexion and extension of the ankle.
- (2) *Ankle Rollers*.—Made by screwing half of a 4 inch diameter wooden ball to the under side of a flat circular board 15 inches in diameter. The man stands on this board with both feet and rolls it in all directions.
- (3) *Chair*, with straps to fix the legs, for weight-and-pulley exercises for the feet only.

Lower Leg.

- (1) A series of 12 hurdles, from 4 to 18 inches in height.
- (2) Low rowing-machine.
- (3) Two foot-benches.
- (4) White lines leading to mirror to teach correct walking.

Thigh.

- (1) Cycles (stationary).
- (2) Bench for weight-and-pulley exercises for quadriceps.
- (3) Rowing machines, fixed and portable.
- (4) Wall bars.
- (5) Step ladder of special design.

Hand.

- (1) Roller machine, with varying sizes of rollers.
- (2) "Sorbo" rubber rings, for finger grip.
- (3) Tennis balls, for grip.
- (4) Portable miniature ladder (made by nailing $\frac{1}{2}$ inch rungs at $\frac{1}{2}$ inch intervals to 3 inches by 3 feet board) for finger-climbing.
- (5) Tenni-quoit rings, for finger grip.

Wrist.

- (1) Wrist roller-machine.
- (2) Indian clubs.
- (3) Skipping ropes.
- (4) Fixed miniature ladder, for finger-climbing.
- (5) Mariner's wheel, with break resistance.

Elbow Joint.

Various weight-and-pulley machines, fixed to wall and floor.

Upper Arm.

- (1) Portable and fixed adjustable rowing-machines.
- (2) Weight-and-pulley machines.

Shoulder.

- (1) Mariner's wheel.
- (2) Suspended trapeze.
- (3) Suspended rings.
- (4) Wall bars.
- (5) Climbing ropes.

Spine.

- (1) Pommel horse, for fixing pelvis.
- (2) Benches, for lying across in extension exercises.
- (3) Wall bars.
- (4) Weight-and-pulley machines.
- (5) Medicine balls.
- (6) Weights, for lifting.
- (7) Indian clubs.

APPENDIX III.

EQUIPMENT OF PHYSIO-THERAPY DEPARTMENT.

- | | |
|------------------------------------|-------------------------------|
| (1) 10 couches. | (7) 1 carbon arc U.V.R. lamp. |
| (2) 3 trestle tables. | (8) 2 combined tables. |
| (3) 4 infra-red lamps. | (9) 6 Faradic batteries. |
| (4) 4 small radiant-heat baths. | (10) 4 arm baths. |
| (5) 4 large radiant-heat baths. | (11) 2 leg baths. |
| (6) 2 Mercury Vapour U.V.R. lamps. | |

APPENDIX IV.

A TRAINING PROGRAMME.

9.15/10.30		11/12.15	14.15/15.15	15.15/16.15
<i>Grade I</i>				
Mon.	Grading	Games	Outdoor work	P.T.
Tues.	Route walk, 3 miles	Education	Outdoor work	P.T.
Wed.	Games	Education	Outdoor work	P.T.
Thurs.	Education	Games	Outdoor work	P.T.
Fri.	Route walk	Swimming	Outdoor work	P.T.
Sat.	P.T.	Lecture		
<i>Grade II</i>				
Mon.	Route march, 3-4 miles	Grading	P.T.	Outdoor employment
Tues.	Education	Games	P.T.	Outdoor employment
Wed.	Drill	Games	P.T.	Outdoor employment
Thurs.	Run, 1½ miles	Education	P.T.	Outdoor employment
Fri.	Drill	Games	P.T.	Outdoor employment
Sat.	P.T.	Lecture		

	9.15/10.30	11/12.15	14.15/15.15	15.15/16.15
		<i>Grade III</i>		
Mon.	Outdoor employment	P.T.	Grading	Games
Tues.	Outdoor employment	P.T.		Route march
Wed.	Outdoor employment	P.T.	Drill	Games
Thurs.	Outdoor employment	P.T.	Drill	Education
Fri.	Outdoor employment	P.T.	Cross-country run, 3-4 miles	
Sat.	P.T.	Lecture		
		<i>Grade IV</i>		
Mon.	P.T.	Outdoor employment	Drill	Grading
Tues.	P.T.	Outdoor employment	Cross-country run, 5-6 miles	
Wed.	P.T.	Outdoor employment	Games	Games
Thurs.	P.T.	Outdoor employment	Education	Drill
Fri.	Route march, 12 miles		Outdoor employment	
Sat.	P.T.	Lecture		

APPENDIX V.

FIRST OF A SERIES OF TWELVE PHYSICAL TRAINING TABLES OF GRADUATED EXERCISES FOR TRAINEES IN A CONVALESCENT DEPOT.

GRADE I.—GROUP (C)—GENERAL.

Part I.—Mobility (6 minutes).

- (1) *Running Activity.* Running, medium pace, interspersed by one of the following: (i) Here, there, where; (ii) Small groups; (iii) Free touch.
- (2) *Arm and Shoulder.* (Astride, one hand on hip) One arm circling backward.
- (3) *Trunk.* (Astride, one hand on hip, one arm crossed.) Trunk and head turning with one arm swinging midway-upward.
- (4) *Leg.* Skip jumping to knee full bending forward, with finger support on given count.
- (5) *Arm and Shoulder.* Arms bending upward, stretching sideways, and swinging sideways-downward.
- (6) *Trunk.* (Astride.) Relaxed trunk bending downward to touch ground (1-4) trunk unrolling (5-8).
- (7) *Leg.* (Astride.) Jumping with arm swinging sideways.
- (8) *Correct Standing and Breathing.*

Part II.—Strength and Endurance (25 minutes).

- (1) *Strengthening and Competitive Team Games.* One of the following: (i) Line tug-of-war; (ii) Poison; (iii) Tunnel ball variations; (iv) Team passing.
- (2) *Trunk.*
 - (i) (a) (Back lying, knees raise, neck-rest, elbow support). Knees lowering sideways to touch ground (in pairs).
 - (b) (Astride, back to back, one yard apart.) Figure-of-eight passing backward to partner (in pairs) (medicine ball).
 - (c) (Side standing, foot rest, hands on hips.) Trunk bending sideways towards raised foot (bench or improvised apparatus).
 - (ii) (a) (Back lying, arms sideways.) Trunk swinging forward-downward with hands assisting, reaching as far forward as possible.
 - (b) (Sitting, facing same direction, one yard apart.) Leg raising and passing ball under knees to partner (in pairs) (medicine ball).
 - (c) High front support; arm bending (1-4), one foot placing forward, left and right (5-8) (bench or improvised apparatus).

- (iii) (a) Prone lying (hands on hips). Trunk bending backward.
- (b) Astride, facing. Relaxed trunk bending downward and stretching forward throwing forward to partner (in pairs) (medicine ball).
- (c) High prone lying (hands resting on ground). Leg action for breast-stroke swimming, later (high prone lying, toes resting on ground, arms upwards, thumbs touching). Arm action for breast-stroke swimming (bench or improvised apparatus).
- (3) *Pulling, Lifting and Carrying.*
 - (i) Technique and practice of pulling (rope attached to tree or derrick).
 - (ii) (a) Technique and practice of lifting and carrying various shaped objects 50-60 pounds in weight.
 - (b) Two-, three-, and four handed method of carrying an injured man (in threes).
- (4) *Marching and Running.*
 - (i) Marching, with co-ordinated breathing.
 - (ii) Running, cruising action.

Part III.—Agility (25 minutes).

- (i) Climbing, using arms and legs (free style) (vertical rope).
- (ii) Running side vault (benches or improvised apparatus, waist high).
- (iii) Running through vault to high standing and immediate downward jump off both feet (benches or improvised apparatus crosswise).
- (iv) Forward roll (mat).
- (v) Backward roll (mat).
- (vi) Running forward high jump (jumping stands or low obstacles).

Part IV.—Final (3 minutes).

- (1) Marching with special attention to poise and carriage.
- (2) (Astride, hands on hips.) Breathing (full range).
- (3) Position of attention.

ACUTE FULMINATING HÆMOLYTIC SYNDROME, FAT NECROSIS OF THE LIVER AND ACUTE NECROTIZING NEPHROSIS FOLLOWING SULPHANILAMIDE THERAPY.

BY CAPTAIN R. S. MURLEY,
Royal Army Medical Corps,

DESCRIPTION OF A CASE AND DISCUSSION OF THE LITERATURE

SINCE the introduction of the sulphanilamide group of drugs by Domagk, in 1935, references to their toxicity have appeared in the literature in profusion. The medical literature of the United States is particularly rich in articles describing the more serious manifestations of drug toxicity seen during sulphanilamide therapy. There is, however, a relative paucity of such articles in the English literature.

This article comprises, firstly, a full description of a recently observed case which terminated fatally following a very short course of chemotherapy and, secondly, a discussion of the relevant literature.

I.—CASE REPORT.

Clinical Features.—F. S., a Sikh sepoy, aged 31, who was employed in a field butchery of the R.I.A.S.C., was admitted to a field ambulance in Massawa on May 9, 1941.

The patient complained of sores on the penis. On interrogation he said that these sores had first appeared on May 3 and that his last exposure to infection was on April 30. He felt quite well in himself and complained of no further symptoms. There was nothing of significance in the past history and he denied having had malaria or previous venereal disease.

On examination he was seen to be a man of medium height and slight build who looked considerably older than his professed age of 31 years.

Local examination revealed a purulent discharge from beneath the prepuce and a fair degree of balanitis. On the ventral aspect of the corona gland were four shallow, circular ulcers, varying from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter and having the clinical character of chancroid sores.

There was no evidence of urethritis or regional lymphadenitis.

A full general examination revealed no further abnormality and the patient was afebrile.

A clinical diagnosis of multiple venereal sores (chancroid) was made.

Treatment and Subsequent Course.—The glans penis was covered with a eusol dressing and irrigated four-hourly with a solution of eusol. On the morning of May 10, the day following admission, a course of sulphanilamide treatment was commenced. The drug used was sulphonamide P. B.D.H. (p-amino-benzenesulphonamide) which was administered four-hourly by mouth, 6 grams being given on the first day and a similar amount on the following day. On the evening of May 10 the temperature was 99° F. and the patient felt quite well.

On May 11 the morning temperature was 98.4° F. but during the day it rose to 100° F. and the patient complained of concomitant headache and

general malaise. On May 12 the temperature was 100° F., the headache was more marked and there were generalized aching pains in the trunk and limbs together with moderate anorexia. Continued administration of the sulphanilamide was considered inadvisable and chemotherapy was immediately stopped, a total of 12 grams having been given during a period of forty-eight hours. By the evening of the same day the temperature had risen to 102·8° F. and all the symptoms were more marked.

The patient passed a very restless night, experiencing "chills" and shivering and, on the morning of May 13, he both felt and looked very ill indeed. At 0600 hours, the temperature was 105·8° F., pulse 120 and respirations 20. The temperature was lowered by tepid-sponging. By 1000 hours the temperature was 102·4° F. but it rose to 105·4° F. in the early afternoon when it was again reduced by tepid-sponging. For the remainder of the day the temperature swung between 101·8° F. and 103·2° F. Full examination at this time revealed no fresh physical signs and there was no detectable enlargement of the liver or spleen.

On the morning of May 14 the patient felt a little better and the temperature was 104° F. By the evening the temperature had fallen to 102° F. and the patient felt much better, having developed an appetite and being anxious to speak to his friends. At this time it was noticed that the venereal sores were healing well and that the accompanying balanitis had subsided.

The improvement was only transitory however and, following another very restless night, the patient felt particularly ill on the morning of May 15. He complained of especially severe aching pain in the loins and passed about 6 ounces of almost black urine. The morning temperature was 103° F., pulse 100. The skin was dry and pallid, the tongue dry and furred.

On the appearance of hæmoglobinuria, treatment with forced fluids was immediately instituted. Sodium bicarbonate (60 grains) was added to every pint of fluid with the intention of rendering the urine alkaline and preventing the deposition of relatively insoluble blood pigment in the renal tubules. By 1000 hours the patient was experiencing considerable nausea and was vomiting quite frequently. Mentally, he was mildly confused and very restless. On account of the vomiting it was thought advisable to administer fluids parenterally and an intravenous infusion of 5 per cent glucose and 2 per cent sodium bicarbonate in normal saline was commenced at 1100 hours.

During this infusion the patient's mental confusion became steadily more marked and localized muscular twitchings developed. Shortly he became irrational, restless and disorientated and he began to speak incoherently and to attempt to flex the arm which was being used for the infusion. The continuation of the struggling and the appearance of generalized muscular spasms made it necessary to remove the intravenous cannula and the infusion was therefore discontinued at 1200 hours when 700 c.c. had been given.

At 1300 hours the patient had lapsed into a semi-coma which was only disturbed by occasional muscle spasms. The pulse became steadily more rapid and was of poor volume while the skin was pallid, cold and sweating. The clinical picture at this time was strongly reminiscent of severe surgical shock. The patient was thought to be faintly icteric but it was impossible to be sure of this in a pigmented subject who had noticeably paled beneath his tan.

By 1400 hours the patient was in coma. The temperature was not recorded at this time but the pulse was thready and very rapid (140). Respirations became shallow, jerky and rapid and were occasionally of a sighing

character. After 1500 hours the pulse was uncountable and the respirations were of Cheyne-Stokes character until the patient died at 1630 hours. During the last few hours of life the clinical picture was that of uræmic coma and patient had passed no urine since 0800 hours that morning.

Investigations.—Urine: The specimen passed on the day of the patient's death consisted of approximately 6 ounces of nearly black fluid. It was not tested for albumin, reducing substance, bile pigments or urobilinogen. The benzidine test was positive. Microscopic examination of an uncentrifuged specimen revealed occasional pigment casts and epithelial cells but no red cells. In view of the positive benzidine test and the absence of red cells it was concluded that the urine contained hæmoglobin or some allied blood pigment.

Blood: Thin and thick blood smears made on May 13 and 15 revealed no malarial parasites after careful examination. Unfortunately no study of the blood picture was made in this case. A specimen of blood removed shortly before death gave a negative Kahn test on subsequent examination.

A post-mortem blood specimen was examined at the Italian Chemical Institute in Asmara and was found to contain no methæmoglobin or sulphæmoglobin.

II.—AUTOPSY FINDINGS.

A partial autopsy was performed three and a half hours after death. The thorax and cranium were not opened and the bone marrow was not examined.

Externally the body exhibited no apparent abnormality.

On opening the abdomen all the exposed viscera were seen to show a moderate degree of superficial congestion. It was impossible to tell by artificial light whether there was any visceral icterus.

The liver was of normal size and consistency. The cut surface was congested and did not exhibit the characteristic pattern. The gall-bladder was normal and contained dark bile.

The spleen was very slightly enlarged and of normal consistency. The cut surface was congested and the Malpighian corpuscles were not easily seen.

The kidneys were of normal size and consistency and the capsule stripped normally. The cut surface was congested, especially in the mid-zonal region. The pelvis and calyces contained a small amount of blood-stained fluid.

No further abnormality of the abdominal viscera was detected.

III.—HISTOLOGICAL FINDINGS.

Liver: In the region of the trinites there is little abnormality other than the presence of tiny fat droplets in the cytoplasm of the cells. In the central portion of the lobules there is marked fatty change (fig. 1). In some lobules the changes present amount to those ordinarily seen at an early stage of acute necrosis of the liver.

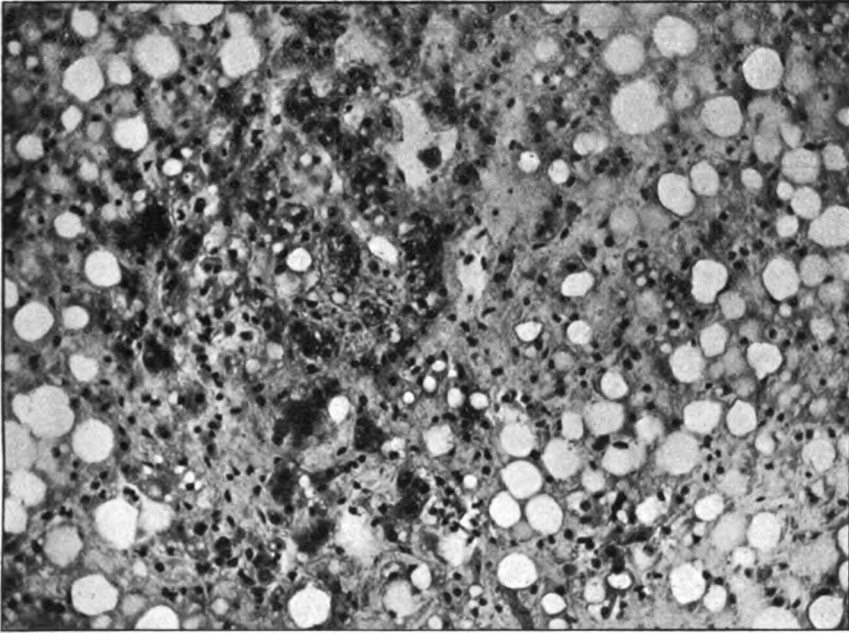


FIG. 1.—Liver. Stain Hæmatoxylin and Eosin. $\times 190$.
Showing fatty infiltration and early necrosis of hepatic cells.

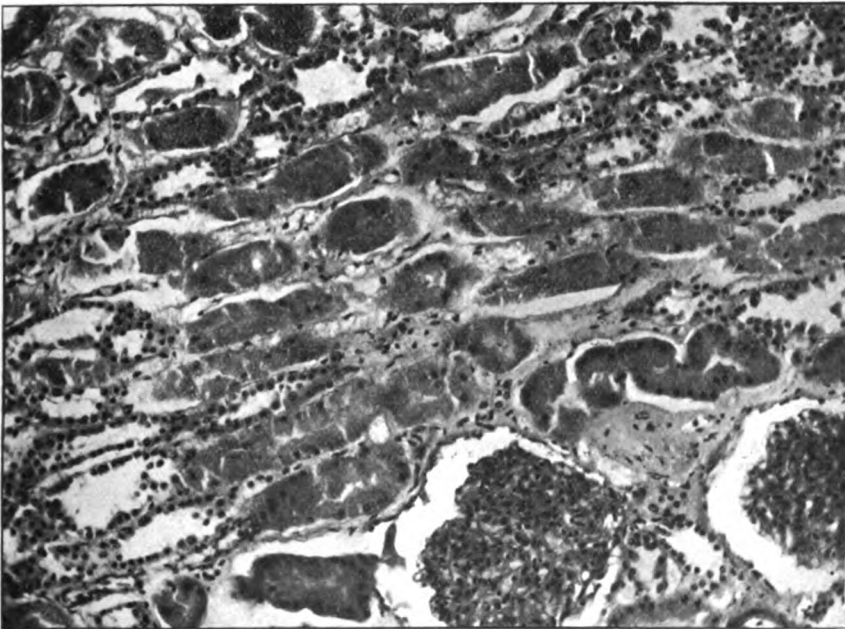


FIG. 2.—Kidney. Stain Hæmatoxylin and Eosin. $\times 145$.
Showing total or partial necrosis in cells of convoluted tubules.

Azan-Petersen staining for reticulum reveals no definite evidence of trabecular collapse.

Prussian-blue staining shows considerable deposition of hæmosiderin. At the centre of the lobules the pigment is seen only in the stellate cells, whereas, at the periphery, it is in the hepatic cells themselves.

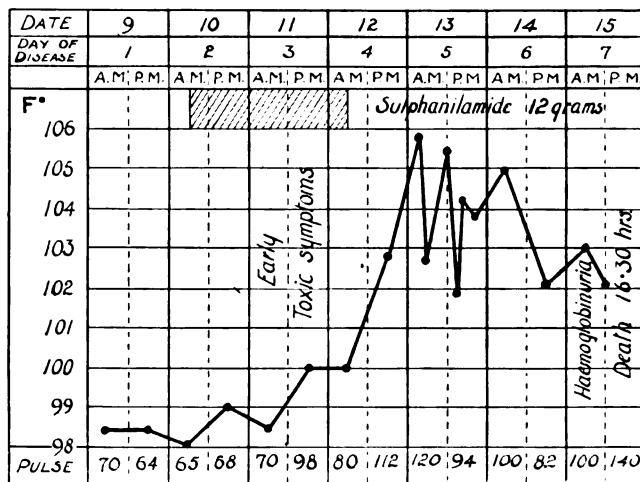
Conclusions: Fatty infiltration of the liver. The histological picture in some respects amounts to that of an early acute necrosis. Marked hæmosiderosis.

Spleen: The sinuses are engorged and there are scattered areas of hæmorrhage near the capsule. There is extensive destruction of red blood cells in the greater part of the section. The Malpighian corpuscles have an irregularly "eaten-up" appearance. There is hyalinization of the arterioles, especially of the penicillate vessels. No malarial pigment is seen.

Prussian-blue staining reveals a very large amount of hæmosiderin.

Conclusions: The histological picture is similar to that seen in cases of hæmolytic icterus.

Kidney: The glomeruli appear fairly normal. There is some vascular congestion in the mid-zonal region. There is total or partial necrosis of the cells in numerous convoluted tubules (fig. 2). Prussian-blue staining



shows a striking absence of hæmosiderin and only two casts are seen in the entire section.

Conclusions: Acute necrotizing nephrosis. Striking similarity to appearances in mercury poisoning.

IV.—DIFFERENTIAL DIAGNOSIS.

During the course of development of this fatal condition a number of diagnoses was considered.

Long and Bliss (1939) have referred to the regularity with which some degree of fever presages the development of serious complications in chemotherapy and they recommend that, on the development of any unexplained fever during chemotherapy, the clinician should "Stop, Look and Listen." Of the wisdom of this advice there can be no doubt. In the case described, mild fever developed on the evening of the first day of treatment. This rise of temperature was probably due to the primary infection, but the increase of this temperature during the next twenty-four hours, together with the associated headache, may well be ascribed to the early toxic action of the drug.

When chemotherapy was suspended on the third day it was believed that the anorexia, headache and aching pain in the trunk and limbs might be due to a superadded dengue infection. The latter condition is extremely prevalent in Massawa at that period of the year.

With continuation and exacerbation of the fever the possibility of malarial infection was considered. The two negative blood smears do not exclude the possibility of malarial infection.

On the development of the acute hæmolytic crisis it was thought possible that the patient had blackwater fever. It is impossible to exclude this diagnosis absolutely but it should be borne in mind that blackwater fever is unusual in coloured subjects and that it is generally associated with irregular suppressive quinine treatment (Megaw, 1939). In considering this last diagnosis it is interesting to conjecture whether sulphanilamide (a known potentially hæmolytic agent) is capable of precipitating blackwater fever in a malarious subject. This point would appear to be of some importance when one considers the growing numbers of patients who are now subjected to chemotherapy in the tropics.

There was a further possibility that the fulminating acute hæmolytic crisis was an example of syphilitic paroxysmal hæmoglobinuria due to an earlier acquired infection. In this case there were no historical or clinical reasons for suspecting previous venereal disease and the Kahn test was negative.

Other possible causes of acute hæmolysis were briefly considered but it was eventually decided that the condition was almost certainly due to the sulphanilamide.

Further mention should be made of two features of this case. Firstly, the development on the day of the patient's death of a condition of circulatory collapse. This condition bears a striking clinical resemblance to severe surgical shock and, according to Dameshek and Schwartz (1940), is commonly seen in association with all forms of acute hæmolytic crisis. Secondly, the development of symptoms suggestive of uræmia shortly before the patient's death. It is possible that a condition of cholæmia or hypoglycæmia induced by the liver damage may have contributed to these symptoms.

Before passing on to a discussion of the literature there is one point

which is of some interest. While in Massawa, I heard from an Italian Naval Medical Officer of two similar cases of fatal hæmoglobinuria following chemotherapy which had occurred there between 1937 and 1939. My informant was not aware of all the details of these cases but said that both patients were suffering from "soft sore" and that both died about five days after starting chemotherapy. The similarity to my own case is very striking but in the absence of any further information it is difficult to say whether or not there is any significance in these cases.

V.—CASES IN THE LITERATURE.

(1) *The Acute Hæmolytic Syndrome.*

There is a tendency among clinicians to regard granulocytopenia and agranulocytosis as the chief complications to be feared during chemotherapy. It is for this reason that the importance of carefully observing the white cell picture is so frequently stressed. A study of the published literature will show that it is by a careful study of the red blood cells that the onset of *early* serious complications will most often be detected. Contrary to earlier belief, hæmolysis during chemotherapy is an exceedingly common phenomenon. Watson and Spink (1940) state that outspoken hæmolytic anæmia should be regarded as a more marked degree of a *usual* toxic effect. These writers state that sulphanilamide, given in the usually accepted doses, almost invariably causes increased hæmoglobin metabolism. A mild degree of hæmolytic anæmia is much more commonly seen than the acute hæmolytic crisis according to Paul and Limarzi (1940).

The cases of acute hæmolytic anæmia described in the literature are seen to be of all grades of severity. On the one hand, there are the mild cases which are only detected by careful routine studies of the blood picture and certain biochemical data while, on the other hand, there are the acute fulminating cases which are characterized by sudden onset, the occurrence of hæmoglobinuria, a short, explosive course and, occasionally, a fatal termination. The latter cases are decidedly rare and should be regarded as the result of an idiosyncrasy to the drug. Agranulocytosis, however, is seen much later in treatment and rarely occurs before the tenth day. It is generally due to prolonged treatment or to injudicious dosage with the drug.

For the purposes of clinical classification it is possible to divide the cases of hæmolytic anæmia into acute and acute fulminating varieties. The main characteristic of the latter type is the occurrence of hæmoglobinuria and this feature merely indicates that the hæmolysis has been of such a degree of severity that the body has been unable to dispose of the products of red cell destruction in the usual manner.

(a) *Acute Hæmolytic Anæmia.*—Non-fatal cases of this type have been described by Jennings and Southwell-Sander, three cases (1937), Harvey and Janeway, three cases (1937), Kohn (1937), P. and A. H. Rosenblum (1938),

W. B. Wood, twenty cases (1938), Spence and Roberts (1939), Spring and Bernstein, two cases (1940) and Bennett and Ware (1941). One case is described by each author unless otherwise stated.

W. B. Wood (1938) and Long *et al.* (1939) have investigated large numbers of patients subjected to chemotherapy and found a total incidence of hæmolytic anæmia in approximately 4 per cent, the condition being three times as common in children as in adults. Spence and Roberts (1939) regard this as an unusually high incidence but it is important to bear in mind that many of the cases described by Wood and by Long would, ordinarily, have remained "sub-clinical" in the absence of such careful investigation.

(b) *Acute Fulminating Hæmolytic Anæmia*.—Non-fatal cases are described by W. B. Wood (1938), Myers and Rom (1940) and Antopol *et al.* two cases (1939).

Fatal cases of this variety are described by H. Wood (1938), Koletsky (1939) Tavat and Shepard (1939) and Ravid and Chesner (1940).

Rather than discuss each of these cases separately it is deemed advisable to integrate the information derived from a study of these papers.

FEATURES OF CASES.

(a) *Dosage of Drug*.—There is no relation to the dosage of drug given nor to the blood concentration attained. There is a possibility that in some cases the patient may have been "sensitized" by an earlier course of chemotherapy. Spence and Roberts (1939) describe a case where the patient had had a previous spell of treatment six weeks before the course which precipitated the attack of hæmolysis.

(b) *Form of Drug Used*.—The only case of hæmolytic anæmia due to sulphapyridine which has been described was that published by Ravid and Chesner (1940). In two cases the drug used was "prontosil" and in the remaining cases the preparation is merely described as sulphonamide.

(c) *Type of Infection*.—There appears to be no relation to the type of infection being treated.

(d) *Type of Patient*.—A large number of the cases described in the American literature occurred in negroes. It has been suggested that this is due to the sickle-cell trait; but, according to Mason (1938) sickle cells are no more fragile than normal red blood cells.

(e) *Prodromata*.—Early toxic symptoms in the form of anorexia, nausea, headache, giddiness and vomiting are nearly invariable and are generally seen at least twenty-four hours before the hæmolysis is detected.

(f) *Onset*.—The condition develops between the third and eighth days of treatment and, most often, on the fifth day.

(g) *Course*.—Varies according to the intensity of the initial hæmolysis, whether or not it is continued, and the form and efficacy of the treatment given.

(h) *Clinical Features*.—These cannot be regarded as in any way specific. Headache, restlessness and irritability are commonly seen. Symptoms

such as anorexia, nausea and vomiting may be directly due to the drug or the result of coincident liver damage.

Symptoms due to anæmia such as weakness, dyspnœa and palpitations are described but they are usually overshadowed by the more dramatic features of the case.

On examination the patient is pale and ill in the more severe cases. Fever is nearly invariably seen and the temperature may reach 105° F. or even more. Such fever is seen in nearly all cases of hæmolytic anæmia whatever their ætiology may be.

Jaundice is sometimes seen and the liver is occasionally enlarged. A condition of hepatic insufficiency is almost certainly present in all those cases exhibiting jaundice and the true significance of this sign is frequently overlooked. Spring and Bernstein (1940) and Watson and Spink (1940) have stressed the frequency with which liver damage remains undetected in these cases.

Rosenblum (1938) observed enlargement of the spleen in a child of ten with hæmolytic anæmia. Splenomegaly is a constant feature of the experimental cases according to Machella and Higgins (1938).

There is a very definite tendency for the condition to recur if the drug be given on any subsequent occasion. Of five patients who are known to have had a second course of sulphanilamide after one attack of acute hæmolysis all but one developed the condition again.

(i) *Prognosis*.—Generally the prognosis is good, even in the acute fulminating cases, provided that treatment is early and adequate.

(j) *Laboratory Findings*.—(i) *Blood*: The degree of anæmia is variable. The hæmoglobin may fall by 30 per cent to 70 per cent and there is a proportionate reduction in the red cell count. Reticulocytosis is generally seen and may be very marked. Nucleated red cells sometimes appear in the blood-stream.

Polymorphonuclear leucocytosis is invariable. The white cell count generally exceeds 20,000 c.mm. In one of Harvey and Janeway's cases the white cell count was 87,000 c.mm. Immature white cells are occasionally seen.

No details regarding the platelet count have been published.

The blood picture cannot be considered as in any way distinctive. The leucocytosis is not attributable to coincident infection as it is seen in the great majority of cases of "idiopathic" hæmolytic anæmia. It was a misinterpretation of this finding which led Lederer to dub his cases as "a form of acute hæmolytic anæmia probably of infectious origin."

Raised icterus index, increased serum bilirubin and a positive direct van den Bergh reaction were found in those cases where these investigations were done.

(ii) *Urine*: Hæmoglobinuria is seen in the acute fulminating cases and it may be the outstanding clinical feature as in the case described by Tavat and Shepard (1939). Red blood cells are occasionally seen in the urine.

Albumin and casts are commonly present in the more severe cases. Increased urinary urobilin excretion is an early feature according to W. Wood (1938). Where urobilinogen is present in the urine it almost certainly indicates liver damage.

(iii) Stools: Increased fæcal urobilinogen is seen in all cases where there is clinical evidence of hæmolysis (Watson and Spink, 1940).

(k) *Pathology*.—In the fatal cases, there is little gross abnormality at autopsy and there are no specific features. Pallor or congestion of the viscera, with or without visceral icterus, may be seen. The spleen is constantly congested and the bone marrow is hyperplastic.

Histologically there is hæmosiderosis of the spleen and liver and a normoblastic hyperplasia of the bone marrow. Ravid and Chesner describe a case in which there was fatty infiltration of the liver of central distribution similar to that seen in my own case.

The spleen shows congestion and hæmorrhagic areas while there is hyperplasia of the reticulo-endothelial elements.

(l) *Differential Diagnosis*.—The hæmolytic condition has to be differentiated from acute paroxysmal hæmoglobinuria of syphilitic ætiology, "idiopathic" hæmolytic anæmia and, in the tropics, blackwater fever. Spence and Roberts (1939) describe a non-fatal case of hæmolytic anæmia following chemotherapy in a syphilitic subject while H. Wood (1938) and Koletsky (1939) describe fatal cases in syphilitic subjects. The syphilitic infection may have been a pathogenetical factor in these three cases. "Idiopathic" hæmolytic anæmia would be a dissatisfying diagnosis to apply to any patient who had been receiving a potentially hæmolytic agent. In the tropics, blackwater fever cannot be absolutely excluded and it is possible that sulphanilamide may be capable of precipitating this condition in like manner to quinine.

(m) *Causation of Hæmolysis*.—It is, as yet, impossible to say whether the destruction of the red cells is due to the direct action of the drug or the agency of hæmolysins. The latter explanation is the more likely. Several observers have failed to incriminate any definite hæmolysins in these cases and one can only postulate that the normal hæmolysins are increased or that "precocious" ones are formed. There is a further possibility that the normal antilytic activity of the blood is reduced in some way either by the direct or indirect action of the drug.

Antopol *et al.* (1939) observed auto-agglutination of the red cells in two cases. It is interesting to note that many years ago Widal *et al.* pointed out the constant occurrence of auto-agglutination of the red cells in cases of acute hæmolytic icterus. Many immunologists comment on the close relationship between iso-hæmolysins and iso-agglutinins in the human subject. The observation of this phenomenon in two patients who had been receiving sulphanilamide would appear to bring some, at least, of these cases into alignment with those of acquired hæmolytic icterus of the acute type.

It is impossible to develop this important aspect of the subject any further here and for fuller information concerning the part played by hæmolysins in hæmolytic anæmia the reader is referred to the masterly monograph of Dameshek and Schwartz (1940).

In conclusion it may be said that in spite of this condition being precipitated by sulphanilamide there is a strong possibility that, in some cases, the pathogenesis may be closely related to that of the idiopathic variety of acute hæmolytic anæmia.

(n) *Experimental Findings*.—Machella and Higgins (1938) induced hæmolytic anæmia in rats by means of sulphanilamide. They found that the degree of anæmia was related to the dosage of the drug. There was accompanying hyperplasia of the bone marrow. Complete recovery occurred on withholding the drug and, with a second course, the condition recurred. The authors state that toxic symptoms were commonly seen and that splenomegaly and hepatomegaly were significant features in the animals receiving large doses.

(o) *The Question of Treatment*.—(i) Preventive: In view of the fact that this condition is the result of a drug idiosyncrasy there is little opportunity of preventing its occurrence. Furthermore, early recognition of the condition will in no way insure against the development of severe anæmia. In spite of this there can be no doubt that the patient should be carefully observed for the development of early toxic symptoms and the onset of anæmia, unexplained fever, jaundice or the presence of increased urinary urobilin should be regarded as highly significant.

Adequate alkalization of the urine may be of value where the development of hæmolysis is feared.

(ii) Curative: On first recognizing or suspecting the development of the condition the drug should be withheld and fluids freely administered. In the majority of cases this is the only treatment required.

Blood transfusion is desirable in the acute fulminating variety of case and should be repeated if necessary. It is of considerable importance that the blood should come from a donor of identical blood group. Where group O blood is given to these patients there is a very real danger that the contained alpha and beta agglutinins will activate the agglutinogens of the recipient and this is especially liable to occur if the agglutinin titre of the donor be high.

In the severest cases which have failed to respond to any other form of treatment it is possible that splenectomy may be of value. For suggesting the possible usefulness of this operation the writer may be deemed guilty of heresy. Before undertaking such a procedure it would be necessary to exclude as far as possible any associated irrecoverable damage of the liver or kidneys. Further development of our knowledge of the mechanism of hæmolysis in these cases may show that splenectomy cannot be altogether excluded as a possible therapeutic measure. In the present state of our knowledge such radical interference would appear to be contra-indicated.

(2) *Liver Damage in Chemotherapy.*

It has already been said that a mild degree of unsuspected liver damage may frequently be present in patients who develop acute hæmolytic anæmia during treatment with sulphanilamide. Thus it appears that jaundice is rarely directly due to blood destruction and that where this symptom develops there is almost certainly some accompanying hepatic dysfunction.

A number of cases has been described in which liver damage is the chief complication of chemotherapy. In the non-fatal cases the available information is both clinical and biochemical and it is difficult to evaluate the type or degree of liver damage present. In the few fatal cases which have occurred the pathological features have shown some variety.

Cases in the Literature.—According to Greene and Hertz (1938), jaundice due to toxic hepatitis is rare. Long *et al.* (1939) agree with this statement having seen only two cases among 408 patients subjected to chemotherapy. On the other hand Watson and Spink (1940) observed jaundice in 16 out of 110 patients treated with sulphanilamide. These observers state that the incidence of jaundice is very much lower in cases treated with sulphapyridine.

Hageman and Blake (1937) describe a case of toxic hepatitis characterized by jaundice and hepatomegaly which rapidly recovered. I have, in the last few weeks, seen a similar case following upon the administration of 15 grams sulphanilamide to a soldier with acute follicular tonsillitis. Complete recovery occurred within three weeks.

Spring and Bernstein (1940) describe two non-fatal cases of acute hæmolytic anæmia in which there was clinical and biochemical evidence of liver damage and, at the height of the condition, biochemical evidence of renal damage. These two cases are in many respects very similar to my own although, of course, much less severe. One developed after the administration of 4.6 grams and the other after 7.3 grams of sulphanilamide. Evidence of liver damage was afforded by jaundice, increased urinary urobilinogen, decreased urinary hippuric acid and a positive direct van den Bergh reaction.

Saphirstein (1938) describes a case of fatal toxic hepatitis with associated exfoliative dermatitis but I have been unable to study his article.

Garvin (1938) describes five cases of toxic hepatitis all of which were characterized by jaundice and considerable hepatomegaly, the total dosage in each case varying from 26 to 60 grams of sulphanilamide. In three cases there was an associated exfoliative dermatitis and one of these patients developed an acute hæmolytic anæmia and died eleven days after the appearance of the jaundice. Unfortunately no autopsy could be obtained on this case.

Cline (1938) describes a case of acute yellow atrophy occurring in a young man who had been under treatment for gonorrhœa. The amount of sulphanilamide taken by this patient is not known as he had been medicating himself with doses greatly in excess of those prescribed. The sym-

tomatology in this case was that of cholæmia and there was marked jaundice. The patient died ten days after the initial development of symptoms. At autopsy the liver was grossly normal but microscopic examination revealed complete disintegration of liver cells and trabecular collapse. The spleen was moderately enlarged and exhibited a hyperplastic splenitis while the kidneys showed nephritic changes.

Russell (1940) describes a similar case in an adult male who had taken 2 grams of sulphanilamide per day for a period of six weeks. This patient died seventeen days after development of symptoms. At the autopsy the liver was greatly shrunk and weighed only 600 grams, while the histological picture was characteristic of acute yellow atrophy.

Berger and Applebaum (1941) describe a case where the patient was given 6.5 grams of sulphanilamide and then, six weeks later, another 20 grams. Jaundice, hepatomegaly and splenomegaly developed and the patient lapsed into a cholæmic coma and died eleven weeks after the first dose of sulphanilamide. Permission for autopsy was not obtained but a small piece of liver tissue was removed through a puncture wound and found to present the histological picture of a toxic cirrhosis.

Fitzgibbon and Silver (1939) published a similar case in which the patient appears to have been "sensitized" by an earlier dose of the drug. Six weeks after his first course of treatment this patient took 1 gram of the drug and, six days later, developed a fatal hepatitis.

Two more fatal cases were described by Bannick *et al.* (1938). Few details of these cases are given, each occurring in the course of cases of ulcerative colitis undergoing treatment with sulphanilamide. The authors state that it was impossible to exclude previous liver damage in these cases.

From a study of these articles it will be seen that liver damage of all degrees of severity may be seen after chemotherapy.

Pathogenesis of Liver Damage.

(a) *Cases Unaccompanied by Hæmolytic Anæmia.*—In these cases the liver damage is ascribed to the toxic effects of the drug. The additional factor of personal susceptibility must, however, be taken into consideration. The prevailing view regarding the cases of acute yellow atrophy is that they are due to a hypersensitivity to the drug in like manner to those cases seen after treatment with arsphenamine or cinchophen (Berger and Applebaum, 1941).

(b) *Cases Accompanying Hæmolytic Anæmia.*—The factors mentioned above must still be taken into consideration but, where there is accompanying hæmolysis, the additional factor of anoxæmia as well as the presence of hæmolysins and the products of red cell destruction may play some part in the causation of liver damage.

It has been shown that fatty infiltration of the liver may be induced in animals by subjecting them to a considerable lowering of barometric pressure (Campbell, 1927. and Rosin, 1937). The fatty changes so produced

are strikingly similar to those seen in my own case and in the case described by Ravid and Chesner (1940). Moreover, it has been shown in the experimental cases that such damage may progress to an acute necrosis but that subsequent cirrhotic changes are never seen. It would seem at least possible that necrotic changes may be similarly produced in man.

Lovibond (1935) described a case of idiopathic hæmolytic anæmia in which the patient died several days after splenectomy. At autopsy, the liver was seen to be in a moderately advanced stage of acute necrosis. The author attributed the liver damage to secondary infection of the operation wound. Several large splenunculi showed infarcts which contained Gram-positive cocci. The infective factor in this case may not have been so important as the author believed and there is a possibility that the liver damage was directly related to the hæmolysis.

The factor of anoxæmia is stressed here because it is deemed worthy of some attention but it would be quite misleading to emphasize the influence of anoxæmia and to neglect the possible influence of hæmolysins and the products of red cell destruction. In conclusion it may be said that, where liver damage accompanies hæmolytic anæmia, a number of different factors may be operative in its causation.

(3) Renal Damage in Chemotherapy.

It is not intended to consider here that particular variety of renal damage which sometimes occurs during sulphapyridine therapy and which is adequately discussed elsewhere (Laird, 1941). A study of the literature does not reveal any cases in which a toxic nephritis has been seen as the sole pathological feature following treatment with sulphanilamide. Such renal damage has, however, been seen in the presence of certain other complications.

In discussing the cases of acute hæmolytic anæmia it has already been said that albumin, casts and red blood cells were seen in the urine of several patients. In one of the non-fatal cases described by Myers and Rom (1940) there was a raised blood urea and non-protein nitrogen and the mild degree of renal dysfunction seen was probably due to tubular obstruction by hæmoglobin breakdown products.

In the case described by Ravid and Chesner (1940) the patient died in uræmic coma. The pathogenesis of this case is somewhat confused as the patient had been treated with sulphapyridine and there was hæmaturia as well as hæmoglobinuria. It was concluded that renal failure was chiefly due to tubular obstruction by intact and disintegrated red cells. The autopsy findings confirmed this and the authors state that the only tubular degeneration seen was largely secondary in nature.

There is a possibility that sulphanilamide can produce a toxic nephritis or, more correctly, an acute necrotizing nephrosis. Thus in the case of acute yellow atrophy described by Cline (1938) there was said to be post-mortem evidence of nephrosis. No details of the histology are given by

Cline and secondary renal damage is, of course, occasionally seen in cases of active yellow atrophy but it is usually not of such a degree as can be labelled nephrosis. In my own case there is the additional complicating factor of acute hæmolysis. In view of the fact that acute necrotizing nephrosis is sometimes seen following incompatible blood transfusion (Osman, 1941) it would appear that, even in my own case, the kidney damage cannot be attributed with certainty to the *direct* toxic effects of the drug.

Experimental observations by Molitor and Robinson (1935) revealed no impairment of renal function with ordinary therapeutic doses and it would therefore be extremely interesting to hear of any human cases in which an acute necrotizing nephrosis *alone* was seen.

VI.—CONCLUSIONS.

In my own case it is not possible to decide the exact relationship between the acute hæmolytic *anæmia* and the development of damage to the liver and kidneys. It is tentatively suggested that the acute hæmolysis was the primary development and that the hepatic and renal complications were secondary in nature.

Fatalities in chemotherapy are admittedly rare but the dangerous potentialities of the sulphanilamide drugs are abundant. Serious complications are, in a large proportion of cases, not associated with excessive dosage and being in the nature of an idiosyncratic response to the drug they are liable to occur in even the best regulated clinics.

The occurrence of such fatal complications, in spite of their infrequency, should serve to promote a healthy respect for the drug, should prevent its indiscriminate use and should encourage the most careful observation of all patients who are undergoing a course of chemotherapy.

VII.—SUMMARY.

A case is described in which an acute fulminating hæmolytic syndrome developed following the administration of 12 grams sulphanilamide to an Indian sepoy with multiple venereal sores.

The accompanying conditions of fat necrosis of the liver and acute necrotizing nephrosis are described.

A full discussion of the relevant literature is included.

Some attempt is made to evaluate the various ætiological and pathogenetical factors concerned.

The frequency with which mild degrees of hæmolysis occur during chemotherapy is referred to and the importance of carefully observing the red cell count is emphasized.

The much dreaded agranulocytosis is a complication of prolonged or injudicious dosage in the great majority of cases. Agranulocytosis is a *late* complication of chemotherapy and is very rarely seen when the drug is

carefully used. Acute hæmolytic anæmia, however, is an *early* complication which is unrelated to incautious use of the drug and may occur in the hands of even the most careful of clinicians.

The importance of exercising adequate caution in chemotherapy is stressed.

On account of the peripatetic character of my work in a field medical unit this paper has been prepared in a number of stations in the Middle East and I must acknowledge the ready assistance which I have received in certain quarters. I desire especially to thank Professor S. I. Franco and Dr. Ungar of the Hebrew University, Jerusalem, and Dr. Sayhoun of the American University, Beirut, for their interpretation of the pathological findings; Dr. Sayhoun and Dr. Ungar for their kindness in preparing the various microscopic sections; Colonel J. S. K. Boyd, Consultant Pathologist, M.E.F., for information concerning certain aspects of black-water fever; Dr. A. Rosin, of the Hebrew University, for her information concerning experimental anoxæmia; Mr. E. Degani, of the Hebrew University, for the preparation of the photomicrographs; Mrs. Sarafian, Medical Librarian of the American University, for her assistance in making available certain of the literature and Major T. Seager, R.A.M.C., for much constructive criticism.

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THE EMERGENCY MEDICAL SERVICE.

By MAJOR-GENERAL R. J. BLACKHAM, *C.B., C.M.G., C.I.E., D.S.O.*

OFFICERS of the Corps returning to this country from foreign service find a large number of sick and wounded soldiers distributed in civil hospitals throughout Great Britain and only about 60 per cent of military patients treated in military hospitals.

This state of affairs is the result of a decision of the Government in 1938, which left measures for protection against air raids to the initiative of local authorities but handed over to the Minister of Health the hospital arrangements for dealing with casualties not only from aerial bombardment but from military operations at home and overseas.

The task presented to the Minister of Health was twofold: (1) the adaptation of civil hospitals for the reception of Service sick and wounded in addition to police and civil casualties; (2) the organization of a medical service to treat the patients in the emergency hospitals thus formed. The first procedure for the adaptation of existing hospitals to war needs is known as the Emergency Hospital Service.

The Minister was assisted in his original task of organizing the hospitals for war purposes by a number of consultant specialists who advised the Minister on special aspects of the work in consultation with local authorities and representatives of the voluntary hospitals. The appointment of these specialists was made with the advice of the Royal Colleges of Physicians and Surgeons.

To understand the position it should be pointed out that Great Britain (and Northern Ireland) was divided into twelve Regions for the purpose of civil defence and each Region placed under the control of a Regional Commissioner, usually a distinguished soldier, sailor or civilian. This Commissioner has very wide powers and is the supreme authority in his Region on all matters in relation to civil defence in connexion with the national emergency when the Region is cut off from Whitehall.

The Emergency Hospital Service has been constituted into a separate Division of the Ministry of Health—styled the Emergency Medical Service—with, at its head, a Director General on the Staff of the Ministry of Health.

Each Region has a Principal Regional Medical Officer who is responsible for the ordinary duties of the Ministry of Health in the Region and in addition a Hospital Officer who deals with the hospitals and the medical personnel of the E.M.S. of the Region. The Hospital Officer is employed full time and, just as the D.D.M.S. of a Command deals direct with the War Office, the Hospital Officer deals direct with the Ministry of Health at Whitehall.

No. 5 Region is the London Metropolitan Area and here the uniformity

of the scheme is radically modified. The London Region was originally divided into ten sectors (later modified to nine) each based on a teaching hospital; and instead of a Hospital Officer for the whole Region there are nine whole time officials who are styled Sector Hospital Officers. In addition there is a Casualty Services Officer for this Region who controls the First-Aid Posts and inter-hospital transport.

Group Officers exist in other Regions but they are part-time officials and have limited responsibilities; but the Group Officers in London in their own Sectors have all the powers of Hospital Officers of Regions. Moreover their areas in all cases extend outside the Metropolitan area.

The Sector Hospital Officers of London are either physicians or surgeons on the staff of the particular London teaching hospital on which the Group is based. They are whole-time officers and most of them had military experience in the war of 1914-1918.

The London Sectors are based on teaching hospitals as follows :—

- | | |
|---------------|---|
| Nos. 1 and 2. | The London Hospital. |
| No. 3. | St. Bartholomew's Hospital and Royal Free Hospital. |
| No. 4. | University College and Charing Cross Hospitals. |
| No. 5. | Middlesex Hospital. |
| No. 6. | St. Mary's Hospital. |
| No. 7. | Westminster and St. George's Hospitals. |
| No. 8. | St. Thomas's Hospital. |
| No. 9. | King's College Hospital. |
| No. 10. | Guy's Hospital. |

Hospital Officers control the motor ambulance services of the Regions, assisted by an Ambulance Officer on the Headquarters Staff of each Region. The Ambulance Services are an important section of the Civil Defence Service and are of great interest to the Military Administrative Officer as they must be relied on for moving Service casualties in an emergency.

The Emergency Medical Service is the first large-scale civilian organization for the reception of war casualties which has ever been formed. When the Government decided on forming this service it was at the same time agreed with the War Office that in new hospital expansion the provision of military hospitals would be restricted to very few more than were actually in existence on the outbreak of war.

The object of the scheme has been to extend civilian facilities to all Service patients and this hospitalization of Service patients in civil hospitals has involved special arrangements for their discipline, pay, clothing, visits by relatives and statistical records.

It is intended that Service patients, as far as practicable, should be grouped in blocks of beds but unfortunately small numbers of Service patients have to be admitted to various hospitals scattered all over the country. Adminis-

tratively the grouping of all Service patients in special blocks in selected hospitals is desirable.

Administrative Army Officers could carry out this desideratum through military registrars, who will be referred to later, and the only objection to it is the cost of redistributing these patients. This would be offset by the better control of the military patients.

The Ministry of Health has classified the civilian hospitals throughout the country in three classes: Class 1A; Class 1B; Class 2.

Class 1A Hospitals.—In this class are: All large general hospitals whether voluntary or otherwise; special hospitals with facilities for general work; sections of mental hospitals adapted for general work.

Certain hospitals were "up-graded" by hutting wards of a standard Ministry of Health type with accommodation for forty-two beds. Up-grading may be defined as structural adaptation and equipping of existing buildings so as to fit them to deal with casualties. For instance, at Chichester the Royal West Sussex Hospital—a voluntary hospital with 120 beds—was "up-graded" to 330 beds by building five Ministry of Health huts in the hospital garden; and a new municipal hospital—St. Richard's—with 200 beds was "up-graded" to 620 beds by means of ten Ministry of Health hutting wards.

Class 1B Hospitals.—These are chiefly small hospitals which deal with local casualties only.

Class 2 Hospitals.—These are not designed for reception of casualties but are used for convalescent or chronic patients.

The total number of beds in the Emergency Hospital Scheme is about 300,000.

The number of beds in military hospitals and reception stations in Great Britain is about 25,000 and the number of Service patients in civilian hospitals is about 23,000, so it may be stated that half the Service cases are treated in E.M.S. hospitals.

Certain Class 1A hospitals are designated to receive convoys from overseas and, during the Battle of France, many E.M.S. hospitals did receive convoys and dealt with them admirably.

The various hospitals used by the E.M.S. remain under the control of the local hospital authority.

Voluntary hospitals are administered by the Hospital Governors and municipal and mental hospitals are controlled by their County Councils or other local authority.

The Ministry of Health can make structural alterations but only through the hospital authority.

Medical officers in the E.M.S. are in four classes:—

Class I is whole-time. Three rates of pay.

Class II is part-time. Retaining fee.

Class III—doctors employed on a sessional basis.

Class IV are part-time officers paid at a lower rate than Class II.

Junior medical officers are whole-time officers paid at the lowest rate of Class I officers. Housemen are paid by the hospitals to which they are appointed. The Ministry re-imburse the hospitals.

The Superintendents of E.M.S. hospitals are usually the peace-time medical superintendents of the institutions but specially selected officers have been appointed to the charge of various hospitals.

A number of retired R.A.M.C. officers have been appointed to E.M.S. posts in hospitals and in Regions.

Efforts have been made to preserve close liaison between the Emergency Medical Service and the Service Departments.

A senior retired R.A.F. officer is on the staff of the D.G., E.M.S., at the Ministry of Health. His duty is to keep in the closest touch with the Admiralty, War Office and Air Ministry, and report to the D.G.

In each of the Civil Defence Regions there is a general liaison military staff at each Regional Commissioner's Headquarters. This is supplemented by the appointment of a Military Medical Liaison Officer to each region to advise and assist on all questions relating to military patients in civilian hospitals and military medical arrangements generally. Owing to the shortage of doctors the abolition of Regional Liaison Officers is contemplated.

The R.N. Medical Transport Officers fulfil liaison functions in certain Regions on behalf of the Admiralty.

In each Region there is a part-time R.A.F. Medical Liaison Officer who carries out similar duties to the Military Liaison Officer but is not attached to the office of the Hospital Officer.

Liaison at the E.M.S. hospitals themselves was devised at the beginning of 1940 by the appointment of Military Registrars at selected hospitals.

These Officers were appointed to advise the medical superintendents and staffs of not only the hospitals to which they were posted but all neighbouring E.M.S. hospitals on matters relating to the discipline, pay, leave, etc., of Service patients.

In addition, these officers are responsible for the issue and upkeep of hospital clothing, the storage of men's kits and the issue of battledress, etc., where necessary, to men discharged from hospital on returning to their units.

The Military Registrars were R.A.M.C. officers but had no responsibility for the clinical treatment of patients.

In accordance with a recommendation of the Robinson Committee, the medical military registrars were replaced by non-medical officers in 1941, provided with transport and posted to definite groups of hospitals often covering a wide area.

Military Registrars have command of all Service patients in their group of hospitals but, in addition, the Royal Navy has posted Naval Medical Liaison Officers to four large E.M.S. hospitals.

The Military Registrars have no responsibility for hospital statistics. Each E.M.S. hospital has a separate Admission and Discharge Book for all cases for which the E.M.S. is responsible.

Immediately on admission of all patients suffering from war injuries or war service injuries or sickness an Envelope M.P.C. 47 is prepared. In this envelope all clinical papers are enclosed on transfer or discharge of the patient.

On transfer the envelope accompanies the patient. On discharge it goes to the Casualty Records Section, Ministry of Pensions.

A special form, known as Form E.M.S. 105, has been adopted for the notification of all admissions of Service sick and casualties, civilian casualties, and police sick and casualties.

Outside London these forms are supplied to hospitals by medical officers of health of County Boroughs and Counties. In London they are obtained from the Chief Officer of Supplies, L.C.C.

The forms are sent in duplicate by all E.M.S. hospitals to what are called Casualty Bureaux. These Bureaux are set up in each local area and outside London are often in the office of the County Medical Officer of Health.

It will be seen that the Public Health Service plays a very important part in connexion with the E.M.S. as well as the civil defence of all counties and county boroughs.

For some time past, D.D.sM.S. also receive monthly Form E.M.S. 149 which gives a list of all patients in hospital for more than two months. This is designed to prevent over-hospitalization and E.M.S. Circular I 305 of July 15, 1941, lays down that the Inspector of Medical Services, Military Consultants and Presidents of Standing Medical Boards are to be given full facilities for investigating cases which have been a long time in hospital and advising as to their disposal. Fuller use of this provision would prevent retention of Service patients in hospital for longer periods than in Service hospitals. My experience is that Medical Superintendents welcome advice from experienced Service Medical Officers with regard to their Service patients.

The E.M.S. has organized special centres suitably staffed and equipped to provide specialized treatment in the following branches of medicine and surgery :—

1. Orthopædics.
2. Psychoneurosis.
3. Injuries of the Spine.
4. Effort Syndrome.
5. Thoracic Surgery. These centres also study effects of Explosion Blast on the Lungs.
6. Head Injuries (Neuro-Surgery).
7. Facio-Maxillary Injuries.

8. Burns.
9. Skin Diseases.
10. Rheumatism.
11. Children's Units.

The Service is steadily expanding its scope and now provides hospital treatment for evacuees, aliens and a great variety of patients not contemplated on the inception of the scheme.

The War Organization of the British Red Cross and Order of St. John administers a number of Auxiliary hospitals or convalescent homes as part of the Emergency Hospital Scheme.

These institutions are established in private buildings and are suitable only for post-operative, convalescent or mild cases not requiring active surgical and medical facilities. Some have been allotted to special work, e.g. convalescent nurses, eye injuries, French soldiers.

Certain Ministry of Pensions Hospitals work in with the E.M.S. scheme and accept not only amputation but other severe injuries likely to be regarded as attributable to Service by the Ministry of Pensions.

The Emergency Medical Service is a very serious effort on behalf of the Ministry of Health to pool the whole of the hospital accommodation of the country and their medical and surgical staffs not only for treatment of war casualties, Service, police and civilian, but for evacuees and many others who, owing to war conditions, require a degree of hospitalization which would not be necessary under peace-time conditions.

It is the duty of officers of our Corps to endeavour to understand its inception, its organization and its administration and it is hoped that this article may contribute in some small measure to this end.

The foregoing article was submitted to Dr. F. Murchie, Deputy Director General of the E.M.S. at the Ministry of Health, to whom the writer is much indebted for friendly criticism and numerous amendments and corrections.

When the final draft was submitted for his approval, Dr. Murchie suggested that the article should have an addendum on the Emergency Hospital Scheme in Scotland, where the organization is somewhat different to the arrangements south of the Tweed.

Dr. Murchie put the writer in touch with Dr. James Macfarlane at the London Office of the Department of Health for Scotland.

To comply with Dr. Murchie's suggestion, Dr. A. Davidson, the Chief Medical Officer of the Department, has prepared the excellent and concise Memorandum set out below.

I would like to express my sincere thanks to Dr. Murchie, Dr. Davidson and Dr. Macfarlane for their valuable assistance and to Lieutenant-Colonel J. T. Robinson, A.D.G., A.M.D.1, at the War Office, who has taken a

great interest in this article and given me valuable assistance in its preparation.

EMERGENCY HOSPITAL SCHEME IN SCOTLAND.

In the main line of its organization, the Emergency Hospital Scheme in Scotland is similar to the corresponding service which has been set up in England and Wales by the Ministry of Health. Certain difficulties may, however, be briefly mentioned.

In both countries existing hospitals included in the Scheme have remained under their normal management, carrying certain fixed or flexible reserves of casualty beds and running agreed services at the Government's cost, while working, so far as Emergency Scheme patients are concerned, under the general direction of officers of the Health Departments. In England, converted or new hospitals have normally been put under the direct management of the owning authority or body or of another authority experienced in managing hospitals, again under the general direction of officers of the Ministry of Health and at the cost of the Government. In Scotland, on the other hand, while converted hospitals, and hospitals at which huttred annexes have been provided, have remained under the management of the owning authority, the new hospitals, provided exclusively for war purposes, are managed directly by the Department of Health who have thus become a considerable hospital authority having under their direct management 76 hospitals (10,400 beds) out of a total of 230 hospitals (41,000 beds) in the Emergency Scheme.

In England, the operational administration of the Scheme is vested in the Director General, Emergency Medical Services of the Ministry of Health, assisted by other Medical Officers, and is devolved outwards from Headquarters to the Ministry's Regional Hospital Officers for each Civil Defence Region and to Group Officers for the London Sectors. Scotland, on the other hand, forms one Region for Civil Defence purposes, and is divided into five Districts. General control of the Emergency Hospital Scheme in Scotland is exercised by various administrative divisions of the Department of Health, acting in close co-operation with the Chief Medical Officer. This control is devolved outwards from Headquarters to the Department's District Hospital Officers, who have complete operational responsibility in their respective areas.

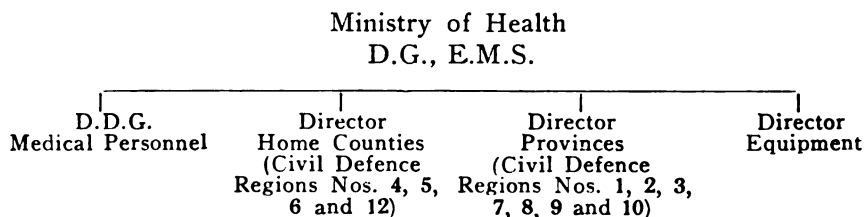
The fact that Scotland forms one Region, and contains only one Military Command, simplifies very considerably the arrangements for co-operation with the Army Medical Service and makes such co-operation much more direct than in England where Regions and Commands overlap.

Allocations of beds for military patients have been made in a number of hospitals and military registrars have been appointed on the same basis as in England. Casualty Bureaux have not been set up in Scotland and notifications in respect of Service cases are made on Form H.O. 4 (the Scottish equivalent to E.M.S. 105) to the Department of Health, who forward them to the appropriate Records Offices. Service patients who have been in hospital for a month or longer are listed monthly in the Department and the lists are considered at meetings with representatives of the Scottish Command and of the Ministry of Pensions at the Department's Headquarters.

*Department of Health for Scotland, Edinburgh 1.
July 3, 1942.*

SUMMARY.

The organization of the E.M.S. may be shown diagrammatically as follows:—



There is also at the Ministry of Health a H.Q. staff for personnel, equipment, nursing services, casualty evacuation trains, liaison, etc., and the service of a staff of Consultant Advisers appointed by the Ministry in Surgery, Medicine and special subjects are available to the D.G.

England, Scotland, and Wales have been divided into twelve Civil Defence Regions and to each of these Regions—less Scotland (Region 11)—the Ministry of Health has appointed a regional staff which includes a Regional Hospital Officer, whose duties correspond to those of a D.D.M.S. of a Command.

The London Region, Region 5, is divided into nine Sectors as the original 1 and 2 have been combined, to each of which is appointed a Sector Hospital Officer.

Group Officers have also been appointed in the provincial regions where their function is to advise the Regional Hospital Officer on the medical staffing of hospitals.

In the London Sectors, however, the Sector Hospital Officers may be regarded as being equivalent to a D.D.M.S. of a Command.

County and County Borough Medical Officers of Health act as agents for Regional Hospital Officers.

Editorial.

WAR AND DERMATOLOGY.

DESPITE the handicaps which it imposes, War confers at least two benefits on medicine. Firstly, under the scourge of War, the tempo of research in nearly all branches is hastened and, during the years of combat, advances are made which would not be accomplished in twice or thrice as many years of peace. Secondly, because of the emergence and rapid disposal of problems which in peace would not be of paramount importance, data are obtained which if analysed and utilized can have far reaching and beneficial effects during the periods of comparative tranquillity known as "peace." But man is an insensate being: seldom does he abstract from his adventures and mistakes the full benefits which he should acquire from them: it would seem in some respects as though when the sword is beaten into the ploughshare the mind of man also becomes bucolic, so that he reverts to the mental trend of bygone generations and willingly foregoes the lessons he should derive from a study of his misfortunes.

These reflections are forced on us by a consideration of the vicissitudes of dermatology and it may be of interest further to elaborate these problems.

It was largely owing to the work of Ferdinand Hebra (1816-1880) that dermatology became recognized as a subject having sufficient scope and sufficient problems of its own to justify its exclusion from the main body of general medicine and recognition as a speciality. In Hebra's time it was thought that syphilis was a systemic disease of which the principal manifestations were cutaneous: therefore this disease fell within the province of the dermatologists. Chancroid, too, was certainly their concern. So the skin specialists took over venereology, accepting responsibility for the treatment of gonorrhœa (which often complicated cases of early syphilis) probably because of *force majeure*. The study and treatment of venereal and skin diseases were thus linked but, from the outset, the combination gave rise to difficulties. In peace these could be solved, but in war the solution was not so facile.

Evidently the experiences of the Medical Services of the Army in the Boer War indicated that dermatology presented unique clinical and administrative problems which were worthy of careful consideration, for in 1903 the Advisory Board for Army Medical Services appointed a sub-committee to investigate fully certain problems with regard to venereal diseases, scabies and certain skin diseases. The importance of the work of this sub-committee may be gauged by three factors: firstly, by the size of the four large reports of its deliberations which were not pigeon-holed but which were printed and issued by His Majesty's Stationery Office; secondly, by

the eminence of the many specialists who gave evidence before it (Alfred Cooper, Radcliffe Crocker, Jonathan Hutchinson, F. J. Lambkin and Malcolm Morris may be named as a few among many), and finally by the facilities which were given to the secretary (Major C. E. Pollock) to visit civilian and military hospitals in France, Germany, Austria-Hungary, Italy, Russia, Sweden, Denmark and Belgium, in order to accumulate data for his comprehensive report concerning the clinical and administrative methods used abroad. In the final report to the Advisory Board of the Army Medical Services, the sub-committee recommended that in Military Hospitals "in charge of sections for the treatment of venereal and skin diseases should be placed officers who have qualified as 'Specialists in Dermatology including Venereal Diseases.' These officers should be encouraged to develop the study and treatment of these diseases in the light of modern methods. . . . Junior officers intending to present themselves for examination in the subject of dermatology and venereal diseases when qualifying for promotion to major, should be appointed to stations where wards for the treatment of these diseases exist under the charge of an officer with the 'Specialist' qualification. Sections of military hospitals properly equipped in the way indicated will give advantages for the training of medical men . . . greater than can be obtained at any civilian hospital in this country."

It would have been reasonable to assume that, with the backing of the sub-committee's findings and the blessing of the Advisory Board, dermatology would have forged ahead. The reverse was the case. Skin diseases are not a particular hazard among a peacetime Army of selected men but venereal diseases are. The Medical Officer who wanted to specialize in dermatology found that there was much more clinical interest and scope in treating venereal diseases than in the limited selection of skin diseases which came his way and dermatology rapidly became a cloak of respectability for venereology.

It was during the War of 1914-18 that Colonel L. W. Harrison established in the British Army a tradition which was to influence both military and civilian practice in this and other countries. During the same years the skin specialists were coping with an incidence of skin conditions which they regarded as surprisingly high but, compared with Harrison, they were singularly unsuccessful in leaving a permanent impress upon current administrative medical thought. Comparisons may be invidious but often they are helpful. In the years between 1919 and 1939 venereology forged ahead; dermatology remained almost *in statu quo*.

The outbreak of the present War found the Medical Services of the Army anxious to give the fullest facilities for the treatment of venereal diseases and in particular for the investigation of the potentialities of the new drugs of the sulphonamide series. At the same time experience in skin diseases was to be compared with the experiences recorded in the last War. It became evident not only that dermatology was statistically and in every other way a matter of great importance but also that it was desir-

able that there should be a separation of venereal and dermatological work; in some stations the work of the venereologist and the dermatologist would overlap, just as the work of a surgeon and a physician may overlap; in some small units officers who had a good grasp of both subjects were required; but in broad outline divergence of control was necessary.

In implementing this policy, the appointment in 1941 of a War Office Adviser in Dermatology was the first step and, in 1942, was followed by the appointments of an Adviser to a Force and of Command Specialists in Dermatology in all Commands in United Kingdom. The value of these appointments to the Army Medical Services will be carefully assessed. They are of interest because in their creation and scope they show that, under the impetus of war, the necessity for planning and co-ordination in dermatology as in other branches of medicine has been manifest and, in meeting this need, the Medical Services of the Army have yet again been pioneers. Much now depends on the dermatologists themselves as to whether the measures taken will leave a permanent impression on the policies of military medical administration during the peace and in subsequent campaigns.

Clinical and other Notes.

A SIMPLE FORM OF "DRESSINGS DESTRUCTOR."

BY MAJOR H. H. CLAY,

Royal Army Medical Corps.

FIELD appliances for the destruction of waste matters may be regarded as of two types or as falling into two classes which, for the sake of distinction, are known as "Incinerators" and "Destructors."

"Incinerators" are used for the incineration of ordinary camp or barrack refuse and similar waste matters which by their nature can be incinerated without the assistance of separate fuel. They are made in many forms according to special requirements or conditions.

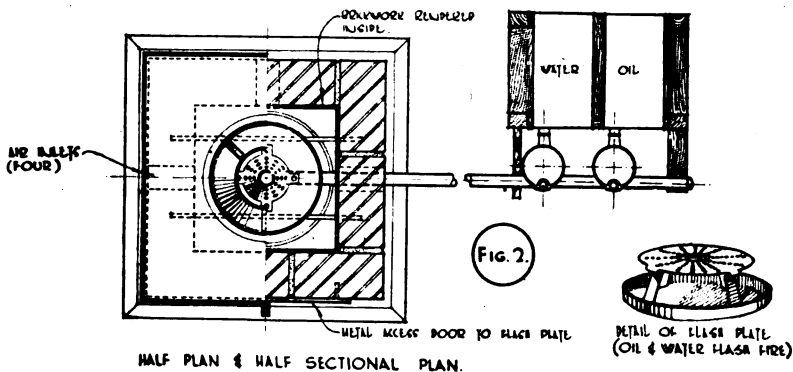
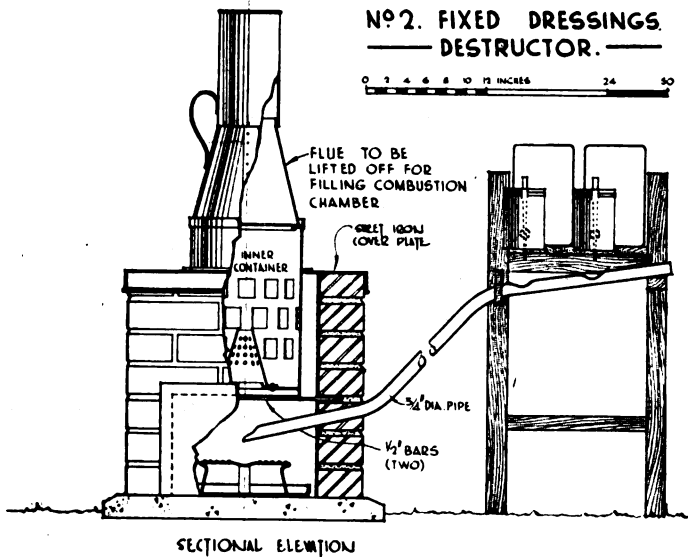
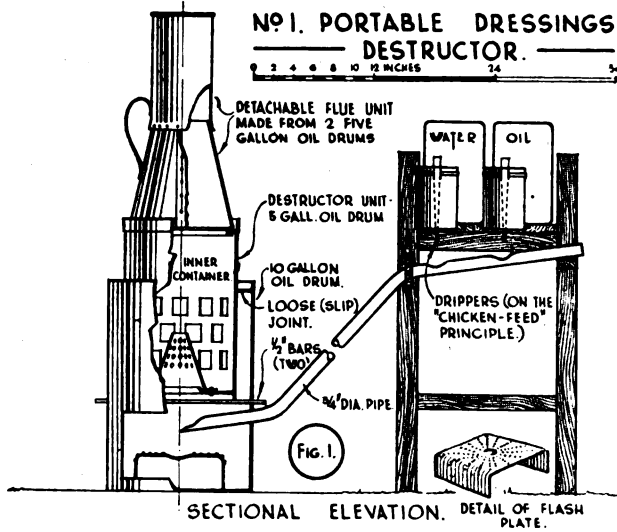
"Destructors" are used for the destruction of waste matters which, owing to their nature or condition, cannot properly be dealt with otherwise than by the combustion of fuel, and for the destruction of which an allowance of fuel is made. Destructors of this kind must incorporate some form of fire-box or burner and must be designed to utilize the maximum possible calorific value of the fuel consumed.

The destructor in most common use is that used for the incineration of the contents of bucket latrines, a good example being the A.S.H. Fæces Destructor which has recently been developed to work satisfactorily with the Oil and Water Flash Fire, using waste sludge oil as fuel [1].

In modern conditions there is great need for a simple destructor specially adapted for the destruction of articles of a textile nature, such as "dressings" of various kinds, the contents of the "sani-bin" and similar articles. To be completely satisfactory, a destructor of this kind must comply with certain fundamental requirements which include the following:

- (a) It must be simple in design and easily improvised as either a mobile or fixed unit.
- (b) It must be easily managed and run, e.g. by the personnel of a women's unit.
- (c) Destruction must be both rapid and complete (smouldering must be avoided).
- (d) Any fumes produced must be effectively combusted.
- (e) The fire must be of a type producing a large and intensely hot flame.

A destructor designed to meet these requirements, made and tested at



the Army School of Hygiene, is illustrated in figs. 1 and 2. It consists of four principal parts:—

- (1) The fire-box or outer container.
- (2) The inner container, in which the articles for destruction are placed.
- (3) A short, tapering and detachable flue pipe 6 inches in diameter at the top and enlarged to 11 inches (the diameter of a 5 gallon drum) at the bottom.
- (4) A simple Oil and Water Flash Burner [2]—of which two forms are shown—and fuel (oil and water) containers.

The inner container and flue can be made as standard units which can be fitted either into an improvised fire-box made from a 10 gallon oil drum, as shown in fig. 1, to form a light portable destructor; or into a small brickwork surround, to form a fixed or permanent destructor, as shown in fig. 2.

The flue is fitted with a stout handle by which it can be lifted from its position, leaving the destructor fully open at a height to enable the contents of any form of bin to be tipped directly into it. No handling of the contents is necessary.

The inner container is made from a 5 gallon oil drum. A 6 inch circular hole is cut in the bottom and, to this, a truncated and perforated cone, about 7 inches in height and open 6 inches in diameter at the bottom and 1 inch in diameter at the top, is fitted as shown in the drawings. Holes about $1\frac{1}{2}$ inches square are cut in the lower portion of the sides of the drum and circular holes about $\frac{1}{2}$ inch in diameter are cut in the cone, but no hole either in the cone or drum is less than 2 inches from the bottom.

The design ensures that articles to be destroyed are spread or opened out in the inner container—not clogged in a mass—in such a way that they are at once subjected to intense heat (*a*) at the bottom, (*b*) through the centre and (*c*) over the surface. The whole of the heat generated and the whole of the draught set up is made to pass under, round and through the contents of the destructor and thence to the flue. If the Oil and Water Flash Fire is properly started before the destructor is “charged,” complete and rapid combustion of cotton and similar articles is ensured, no matter in what condition they may be. The ash produced is prevented from falling on to the burner plate except in insignificant quantities. In practice it is found that flame is omitted from the flue, fumes are combusted and the emission of unpleasant odours is effectively prevented. The smoke produced is negligible.

The destructor is simple to make either as a portable or fixed unit, and is easily managed by one person. It is particularly suitable for use in camps occupied by women.

The materials required are as follows:—

MATERIALS REQUIRED.

No. 1 Portable Destructor

Drums, oil (10 gal.), 1
 Drums, oil (5 gal.), 3
 Oil-water burner, 1
 Bars $\frac{1}{2}$ in. or $\frac{3}{4}$ in. diameter, 12 in. long, 2
 1 gal. petrol or other tins fitted with "chicken feed" drippers, or other suitable supply devices, e.g. taps, 2

Note.—The inner container is made from one 5 gal. drum and the flue from two similar drums.

No. 2 Fixed Destructor

Bricks, 56
 Sand, 3 buckets
 Lime (hydrated), 1 bucket
 Concrete base, 2 ft. square
 Sheet iron plate, 2 ft. 6 in. square, with circular hole 11 in. in diameter in centre, and with the edges turned down 3 in.

Note.—These are in place of the 10 gal. drum used in No. 1. Other materials are as for No. 1.

Where a larger destructor is required the destructor unit may be made from a 10 gallon drum, the other parts being constructed accordingly.

ACKNOWLEDGMENT.

The author is indebted to Colonel E. B. Allnutt, *M.C.*, Commandant of the Army School of Hygiene, for permission to send these notes for publication.

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- [1] *Journal of the Royal Army Medical Corps*, **68**, No. 5, May, 1942, 209-219.
 [2] *Idem*, **68**, No. 6, June, 1942, 260-266.

CONGENITAL CYSTIC DISEASE OF THE LUNG.

BY LIEUTENANT-COLONEL J. S. RICHARDSON, *M.D.Camb., M.R.C.P.*,

Royal Army Medical Corps.

THE number of case reports of congenital cystic disease of the lung is by now quite considerable; in 1937 Schench had found 387 such cases in the literature. It is felt, however, that cases may still be missed and thus a report of three cases seen in serving soldiers is justified.

These cysts appear to result from a failure in the normal process of lung budding. This budding does not develop beyond a certain point and the end of the bronchus dilates to occupy the space that the alveoli should have filled. A cystic space, containing air, is thus formed in communication with a bronchus although the opening may be minute and the bronchus extremely tortuous.

Histologically the cyst walls resemble those of the bronchial tree being lined with ciliated columnar, cubical or squamous epithelium.

At a discussion at the Royal Society of Medicine, Burton Wood (1940) divided these cases into four clinical groups: (1) Balloon cysts; (2) solitary cyst; (3) multiple cysts of the gross "Bubble" type; (4) cystic disease of the "Berry" type.

(1) *Balloon Cysts* usually occur in children and may be very large and by means of a valvular effect produce symptoms of acute dyspnoea. They may closely resemble either a partial or a complete pneumothorax. Such a case is described by Dubrow and Wynne (1938), who stress the importance of visualizing the parietal pleura radiologically before making a diagnosis of spontaneous pneumothorax and of investigating doubtful cases with intrabronchial lipiodol and bronchoscopy.

(2) *A Solitary Cyst*.—This may be mistaken for a tuberculous cavity if it is situated at the apex and the suspicion may be furthered by the fact that the patient may present himself after a hæmoptysis. Another difficulty may be found in distinguishing the cyst radiologically from a large emphysematous bulla but the latter is usually peripherally situated. If the cyst is full of fluid it may be mistaken radiologically for hydatid disease of the lung or for a benign fibroma which may occasionally appear spherical. These single cysts are frequently symptomless and are often accidentally discovered.

(3) *Multiple Cysts of the gross "bubble" type* may also be symptomless unless they become infected of which there is a very real danger. Burton Wood quotes three cases in which a septic infection of the lung was found in association with cystic disease.

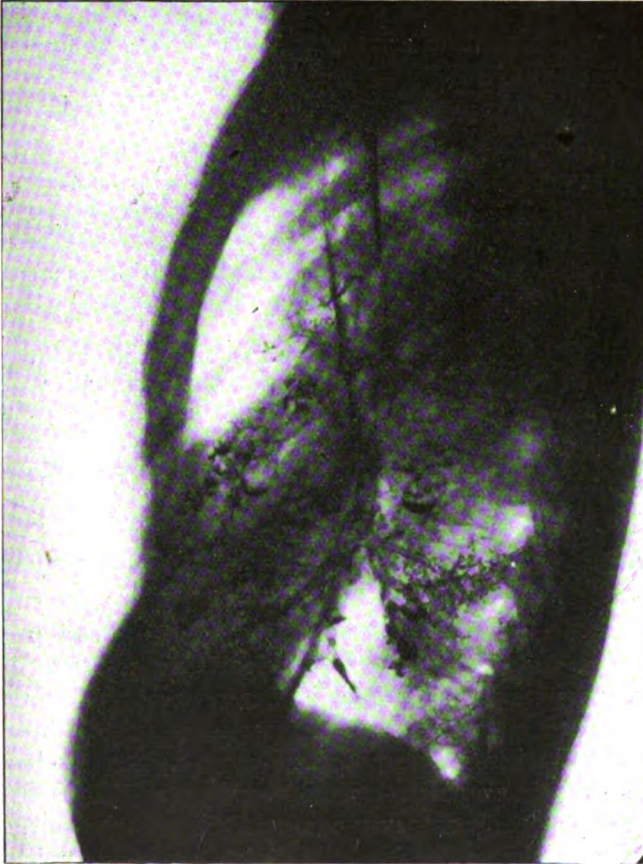
(4) *Cystic disease of the "berry" type* may involve a single lobe, often the upper, or may be present diffusely throughout one or both lungs. This is the type that is also known as the "honeycomb lung" or congenital bronchiectasis. It can only be differentiated from acquired bronchiectasis with any certainty where there is little or no evidence of infection. Once these cases become infected the two conditions may be difficult to distinguish and the treatment, namely pneumonectomy, is the same for both subject to the condition being localized to one lung.

It would appear, then, that cystic disease of the lung can resemble a tuberculous cavity, chronic fibroid phthisis, a pneumothorax or bronchiectasis, together with some rarer conditions.

Case 1.—A private aged 23, with fourteen months' service, was admitted to hospital complaining of shortness of breath and cough with some sputum. In civilian life he had been a cinema operator and was always subject to colds and bronchitis. At the age of 4 he had pneumonia but had had no other serious illness in the past and his family history was uneventful. Since being in the Army he had suffered from increasing shortness of breath and a cough that was most troublesome at night. He had never brought up any blood and his sputum was not profuse or offensive. His weight was steady. He had been fully investigated in August, 1940, in another hospital, to exclude pulmonary tuberculosis, with several negative sputum examinations.

On examination here his general condition was fairly good, although he was a tall asthenic youth with some congenital depression of the sternum. The air entry was poor over both lungs but particularly so at the right base where there was distant bronchial breathing. The most striking signs were masses of post-tussive crepitations in the right mid zone with breath

sounds that "rustled" like enormously amplified vesicular breathing. An X-ray of the chest was suggestive of honeycombing of the right lung in the middle and lower zone, near the hilum. His sputum contained neither tubercle bacilli nor elastic tissue and was chiefly mucoid. Lipiodol was introduced through the cricothyroid membrane and the right lung field was visualized. The appearances that are typical of the "berry" type of cases were seen and were specially striking in the picture taken in the lateral position. The left lung was also filled with lipiodol on a second occasion,



CASE 1.—Lateral X-ray.

and showed a cystic condition of the lower lobe, thus precluding any possibility of radical cure. This was disappointing as his general condition was satisfactory and it was thought that he was not yet more than mildly infected.

Case 2.—A private soldier, aged 24, with six months' military service, complained of a severe cough with dyspnoea on exertion and some sputum.

At the age of 5 he had had a severe illness that was described as

pneumonia and "septic poisoning." He had attended school regularly but when he began work as a bricklayer he was frequently off sick because of his chest. He was never admitted to hospital and had had no other serious illnesses.

He was accepted for the Army in Grade 1, but reported sick with bronchitis within a month of joining. He was admitted to hospital at the end of another month but was returned to duty after two weeks. His symptoms recurred and he was admitted to another hospital with tonsillitis and a high temperature. His sputum at that time was frothy and mucopurulent but not particularly foetid and about 2 ounces daily in amount. It never contained blood and repeated examinations for tubercle bacilli were negative, as was culture on special media. His lungs contained numerous rhonchi throughout them and in the right mid zone in front masses of crepitations were to be heard that led to a loud rustling respiratory murmur almost identical with that heard in the first case.

The straight X-ray showed well marked honeycombing in the right mid zone and the introduction of lipiodol produced the typical picture of polycystic disease with numerous fluid levels. At the base the appearance was that of a gross bronchiectasis but the mid zone was highly characteristic.

Case 3.—A young soldier had been under observation as a suspected case of tuberculosis for some years but concealed this from the recruiting medical board.

He soon found that he was unable to manage his military duties on account of the disabilities his chest occasioned him and was eventually admitted to a sanatorium where investigation failed to show any positive evidence of pulmonary tuberculosis.

The X-ray of his lungs showed numerous cavities throughout both lung fields with thin walls and no surrounding tissue reaction. An X-ray after lipiodol gave a wonderful picture of multiple large cysts in both lungs.

Cases 1 and 2 are examples of the "berry" type of cystic disease, and Case 3 of the multiple large cyst type.

All three cases caused difficulty in diagnosis and had been carefully investigated to exclude pulmonary tuberculosis in more than one hospital. The histories were very similar and, in Cases 1 and 2, together with the clinical and radiological findings, were almost identical. In both, numerous fine crepitations and harsh breath sounds combined to produce a curious rustling respiratory murmur not unlike greatly amplified normal vesicular breath sounds. The diagnosis was confirmed in each instance by a radiogram taken after the introduction of lipiodol but it is emphasized that it could have been made on the straight X-ray alone.

It is important to recognize this condition on two scores. Firstly, on the negative side, it is clear that mistakes can be made in diagnosis and cases may be labelled as tuberculous that are not; no stress need be laid on the importance of this disaster; while, on the positive side, the early realization of the true position will lead to the institution of measures to avoid, as far as possible, infection of the lungs and to early consideration of radical surgical procedures before sepsis has increased the technical difficulties and darkened the outlook.

My thanks are due to Lieutenant-Colonel J. G. Ronaldson for permission to forward this paper for publication.

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BURTON WOOD, W. (1940). *Proc. Roy. Soc. Med.*, **33**, 335.
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SOVIET BLOOD TRANSFUSION INSTITUTES' CONFERENCE.

Moscow, June 3 (Tass).—A conference of doctors from blood transfusion institutes and stations providing field medical establishments with preserved blood has been held in Moscow under the auspices of the People's Commissar for Health Protection, Miterev, and outstanding Soviet physicians and biologists, Academicians Burdenko, Spasokukotsky and Stern. Reports read at the conference showed that all the requirements of army establishments for preserved blood have been fully satisfied, thanks to the great numbers of donors. In eleven months there has not been one case of shortage.

It was also stated that Soviet hospitals are effectively applying blood substitutes evolved by Soviet scientists—a preparation obtained by mixing salt solutions with human blood serum and a colloidal combination of casein and certain synthetic products, anti-shock liquid and other preparations.

The conference devoted great attention to the problem of erythrocytes. In the past, when plasma and blood serum were utilized, the red blood corpuscles remained unused. Soviet scientists have proposed a special solution of salts for the dilution and preservation and subsequent utilization of erythrocytes which represents an excellent blood substitute.

A report on the organization of blood transfusion at casualty clearing stations was made by the Chief Surgeon of the Western front, Prof. Zanaitis. A number of improvements and inventions facilitating and improving storage, transport and transfusion of blood were demonstrated at the conference.

(SOVIET MONITOR.)

CONTINUOUS PENTOTHAL ANÆSTHESIA.

A SERIES OF 200 CASES GIVEN WITH A SIMPLIFIED PORTABLE APPARATUS.

By MAJOR DENNIS DUNNILL,

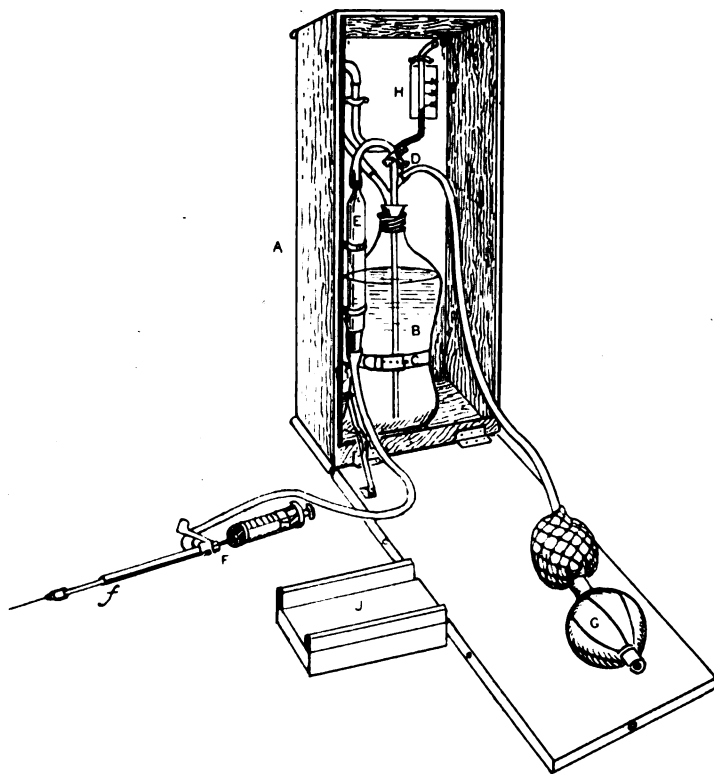
Royal Army Medical Corps.

PERHAPS some apology should be offered for the introduction of yet another anæsthetic apparatus but the one here described has given such complete satisfaction and is capable of being so easily improvised that it

is hoped that these notes may be useful to others, especially to those who like myself are serving abroad in conditions where the choice of an anæsthetic agent is necessarily limited.

The hospital to which I was attached has been serving in a tropical country and under existing local conditions the use of pentothal anæsthesia was found particularly valuable. In these circumstances a simple portable and self-contained apparatus was essential and after some experimenting I devised the following (see illustration):—

"A" is a mahogany case, size 18 by 6 by 4 inches, the lid of which opens downwards to a right angle and is fixed in this position by a brass



elbow fitting; it is kept closed by a small brass hook and eye. "B" is an army transfusion bottle with the standard fitting of a rubber cork through which passes a long and a short glass tube; it is kept in position with a short leather strap "C."

The longer glass tube is connected by rubber tubing, on which is a screw clamp "D," to a drip feed "E" held in position by two spring clips; from the lower end of the drip feed a piece of rubber tubing leads to the device "F" and the intravenous needle.

The necessary positive pressure within the bottle is provided by the

bellows "G" which is connected to one arm of a glass Y-piece attached to the short glass tube; the other arm of the Y-piece is connected to a glass U-tube "H" fitted up as a mercury manometer with a scale in cms.

"F" is a two-way tap leading *via* a piece of tubing and glass window "f" to the intravenous needle and to which a 10 c.c. or 20 c.c. syringe containing the pentothal solution is attached. Until a two-way tap was obtainable a suitable substitute was made by attaching the tubing from the drip feed to one arm of a glass Y-piece; a metal adaptor for attachment of the syringe was connected by an inch of rubber tubing to the other arm, while the long arm was attached to "f."

A removable piece of wood "J" with two side strips is fitted with two nails with their heads cut off protruding from one end and this can be fixed in place by pushing the nails into holes in the side of the case lid; it provides a convenient and safe platform on which the syringe of pentothal solution may rest while the operation proceeds.

The whole apparatus can be removed from the case for sterilizing in a dressing drum after which it has only to be attached to a fresh bottle of sterile saline to be ready for use. The piece of rubber tubing with glass window and adaptor for needle (f), being detachable, can be boiled between cases while a "spare" enables one to carry straight on without any delay.

Technique of Using Apparatus.—The open case can be placed on the arm rest of the operating table, on an instrument table nearby or, if the patient is in bed, on the bedside locker or a chair. A few squeezes on the bellows will provide 10 to 20 mm. Hg pressure within the bottle as shown on the manometer, the latter figure only being required if the level of saline in the bottle is low. The saline is allowed to run through the tubing until all the air has been removed and a steady flow appears from the needle; "D" is then adjusted until "E" shows a satisfactory rate of flow and "F" is then closed.

The needle having been inserted into the selected vein and kept in place with a strip of adhesive tape the tap is turned to admit the saline and we now have a steady drip of saline (or plasma if the case warrants it) entering the vein and, at any time, pentothal may be added at will.

As soon as anæsthesia is required the two-way tap is turned to admit the pentothal from the syringe and, the desired amount having been injected, the tap is returned to its first position so that the saline drip continues until more pentothal becomes necessary when the same action is repeated. All that is necessary from now onwards is an occasional movement of the tap when injection of more pentothal is considered advisable and an occasional glance at the drip feed and manometer, with a squeeze on the bellows when the latter indicates that the pressure has fallen below the desired height.

Discussion.—As with other anæsthetic agents some people show a susceptibility to pentothal, being deeply anæsthetized with 5 c.c. of a 5 per cent solution, while others need 30 c.c. or even more for the extraction of a

single tooth. With the apparatus described the tedium of holding a needle in a vein while repeated doses are given is obviated, as is the temptation to give a single large dose with its attendant risk should the patient be unusually susceptible. A carefully controlled level of anæsthesia over a long period is obtainable by observing the changing signs of anæsthesia and regulating the dosage of pentothal accordingly.

In a series of 200 cases of all sorts lasting from ten minutes to two hours, no anxieties were experienced and, owing to the accurate control of dosage, there was no undue depression of respiration; even in very ill patients and those suffering from shock, toleration appeared to be good and there was no appreciable fall in blood-pressure.

The usual premedication was omnopon gr. 1/3 with scopolamine gr. 1/150 and this undoubtedly assists in reducing the amount of pentothal required. Oxygen was never found necessary but scrupulous care in maintaining a satisfactory airway is essential. The maximum amount of a 5 per cent solution given in this series was 55 c.c. and no ill-effects were noticed after large doses though patients often remained asleep for several hours after returning to bed.

This method would appear to be definitely preferable to the continuous intravenous drip of a dilute solution of pentothal in that the drug can be stopped without having to remove the needle and can at a moment's notice be continued should the operation be prolonged unexpectedly or the depth of anæsthesia become unduly light. Finally, in the event of a rush of casualties necessitating two operations being performed at the same time, a glass Y-piece may be attached to the longer glass tube in the bottle and "D," "E" and "F" may be duplicated.

Conclusion.—A simple portable apparatus for the giving of continuous pentothal is described by which ease of control and a wide margin of safety are obtainable since only the actual dose required by each particular patient is injected as is indicated by the signs of anæsthesia.

The apparatus modified and improved will shortly be obtainable from Messrs. Down Bros., 22A, Cavendish Square, W.1.

THE TREATMENT OF CERTAIN CARRIERS WITH SULPHAGUANIDINE.

BY MAJOR C. A. DE CANDOLE,
Royal Army Medical Corps.

DATA are gradually accumulating regarding the therapeutic value of sulphaguanidine in cases of bacillary dysentery. Anderson and Cruikshank [1] were convinced of its value in treating the acute disease but expressed the opinion that very large doses are necessary to eradicate these bacilli

from long standing infections. Nevertheless the value of such doses was clearly indicated in the report of Boyd and Hamilton Fairley [2] on the trials in the Middle East of sulphaguanidine in acute and subacute Shiga infection.

Seven patients, six found to be carriers of dysenteric organisms and one a carrier of *Salmonella morbificans bovis*, have been treated with sulphaguanidine with the results stated.

Those harbouring dysenteric organisms ought perhaps to be described as suffering from chronic dysentery but such a description is inapplicable to these cases, the majority being free from signs or symptoms. It is worthy of remark here that dysentery bacilli were isolated from stools entirely devoid of macroscopic blood or mucus and showing no abnormality in the films examined microscopically. This observation accords with recent experience at the Cardiff Emergency Public Health Laboratory [3].

A total of 48 grams of sulphaguanidine was given to each one, distributed as follows: 3 grams were given three times a day for two days and 2 grams three times a day for a further five days. An alkaline mixture containing 30 grains of sodium bicarbonate was administered with each dose of sulphaguanidine and fluids were pressed. The patients under treatment had no meat but were, in other respects, on a normal diet.

No toxic effects were noticed.

The following is a summary of the individual features:—

Patient	History of Case	Organisms isolated before treatment	Result of treatment
F.	"Dysentery" in Libya 12 months ago. Symptomless now but discovered to be a carrier of <i>S. morbificans bovis</i>	<i>S. morbificans bovis</i> . 17.2.42. 26.3.42	Ineffective. <i>S. morbificans bovis</i> still present after completion of course
C.	Dysentery in Egypt February, 1941. Has had attacks of colitis since. Afebrile and symptomless when admitted	<i>B. dys. Flexner</i> (Group I) 24.5.42	Effective. Eight negative stools subsequent to treatment
Z.	Diarrhoea in South Africa August, 1941. Further attack in January, 1942. Symptom-free on admission	<i>B. dys. Flexner</i> (Group II) 24.5.42	Effective. Ten negative stools subsequent to treatment
B.	Dysentery in Suez a year ago	<i>B. dys. Shiga</i> -4.42 23.5.42	No conclusion possible. <i>B. dys. Schmitz grown</i> after treatment due to a fresh infection
SA.	Diarrhoea in June, 1941, in Libya. No symptoms while in hospital	<i>B. dys. Flexner</i> (Group II) 4.5.42 28.5.42	Effective. Nine negative stools subsequent to treatment
V.	Dysentery in 1941. Admitted with abdominal pain and tenderness as a suspected case of appendicitis	<i>B. dys. Shiga</i> 30.5.42	Effective. Eight negative stools subsequent to treatment
SP.	Dysentery in Libya 1937-38 with occasional diarrhoea since. No symptoms while in hospital	<i>B. dys. Flexner</i> (Group II) 7.6.42	Effective. Ten negative stools subsequent to treatment

In order to ascertain whether the treatment was effective or not, stool examinations were made from each patient to the number of from eight to ten spread over a period of more than a month. This was felt to be sufficiently searching to enable conclusions to be drawn.

The technique used was the same before and after treatment, the faeces being plated on desoxycholate-citrate agar and litmus-lactose agar and a wet preparation examined microscopically. The early specimens were examined fresh but, later, owing to the removal of the patients elsewhere, specimens were sent emulsified in glycerine saline of a reaction approximately pH 8.0.

Incidentally, the tremendous superiority of desoxycholate-citrate agar over litmus-lactose agar in the isolation of these organisms should be stressed. It is, I think, safe to say that none of the dysenteric organisms in this series would have been recovered using litmus-lactose by itself in this laboratory. On one occasion *B. dysenteriae* Sonne grew profusely on a desoxycholate plate from a stool which had stood without any preservative in the laboratory overnight.

It will be seen from the table that in no case was the same organism re-isolated after treatment. The patient "B," however, had an acute febrile attack with diarrhoea during the "follow up" period. *B. dysenteriae* Schmitz being isolated from him then and subsequently. There seems little doubt that this was a fresh infection.

CONCLUSIONS.

Sulphaguanidine, in the dosage stated, appears to have been successful in eliminating dysenteric organisms of various types from five chronic carriers but to have failed to do so in the case of a carrier of *Salmonella morbillans bovis*.

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- [2] BOYD, J. S. K., and HAMILTON FAIRLEY, *Lancet*, 1942, 1, 20.
- [3] *Monthly Bulletin of the Emergency Public Health Laboratory Service*, June, 1942, p. 9.

Current Literature.

KINGHORN, H. M. **The Diagnosis of Tuberculosis, especially of Pulmonary Tuberculosis.** *J. Amer. M. Ass.* 1940, Nov. 9, v. 115, No. 19, 1614-20.

A large part of this paper is devoted to matters which are the concern of the clinician rather than the public health worker, but there are points which are of interest to both. The author devotes considerable space to developing the argument that X-ray examination is much more delicate than physical examination or laboratory tests in detecting tuberculosis of the lungs. Several groups of figures are given but cannot all be quoted; in one group of

1,367 patients diagnosed by Sampson and Brown, 99 per cent showed definite X-ray changes, 68.5 per cent had râles at an apex, 61.5 per cent had positive sputum, 33.5 per cent had hæmoptysis and 12 per cent had pleurisy. The proportion of patients with negative X-ray who have subsequently developed tuberculosis is minute. Nevertheless, the art of physical examination should be cultivated since X-ray facilities may not always be available.

Stereoscopic methods should be used whenever possible, and the place of tomography in the diagnosis of cavitation is assured. The interpretation of films will always depend to some extent on personal judgment, but experience, especially if combined with clinical observation and pathological studies; leads to remarkable accuracy. It is pointed out that in children X-ray evidence of pulmonary tuberculosis may exist for years before symptoms arise. In the determination of activity of lesions X-ray appearances give some guidance, but close study is required; the author gives certain leading principles.

In discussing the X-ray examination of children the author gives his opinion that *all* children should be so examined at least once each year. This has been done at Saranac Lake and is justified by the discovery of a few cases of disease. He discusses differential X-ray diagnosis and points out the value of radiography in estimating prognosis. C. W.

Reprinted from "Bulletin of Hygiene," Vol. 16, No. 9.

PASRICHA, C. L., & GHOSH, S. K. **A Simple Method of Obtaining Anaerobiosis.** *Indian M. Gaz.* 1941, Feb., v. 76, No. 2, 88-89.

Satisfactory growth of anaerobes could be obtained in a desiccator or any other airtight vessel, such as a tumbler closed with a Petri dish lid sealed with plasticine, by allowing moistened iron filings to rust in the bottom of the container. It was not found necessary to replace the resulting vacuum (1/5 volume), and if clean filings were used no H₂S was produced. Anaerobiosis sufficient to decolorize the usual indicator developed in six to twelve hours according to the size of the jar and amount of filings used. For a jar of 1,000 c.c. capacity 60 grammes were required. The method is cheap and needs no special apparatus. The authors suggest that sterile filings may be used to obtain surface growth of anaerobes in flat screw-capped bottles, and they have also used them in the bottom of agar deeps and in broth tubes in place of cooked meat. J. C. CRUICKSHANK.

Reprinted from "Bulletin of Hygiene," Vol. 16, No. 9.

MOEWARDI. Diphtherie-bacteriën in het secreet van oorlijders. [**Diphtheria Bacilli in the Discharge of Ear Patients.**] *Geneesk. Tijdschr. v. Nederl.-Indië.* 1941, Jan. 21, v. 81, No. 3, 119-35. [20 refs.]

Cases of primary diphtheria of the middle ear seem to be entirely unknown. The present research was carried out on patients with acute otitis media (1) where the drum was not perforated and (2) where the drum was

perforated but not more than two weeks had elapsed and the condition had remained untreated. Altogether 66 "sucklings," 111 "toddlers," 58 school-children and 105 persons of older age were examined for the presence of diphtheria organisms. None of the 340 patients had any symptoms of general toxic diphtheritic inflammation. It was found that diphtheria bacilli could be isolated from ear or nasopharynx in 35 persons; in 10 from throat alone, in 16 from the ear alone and in 9 from both situations. Altogether 48 diphtheria strains were isolated, of which 16 were of *gravis* and 32 of *mitis* type. Twenty strains were subject to virulence tests and 10 of these proved to be virulent for the guinea-pig. Thus virulence of the organism isolated is no proof that it is toxic for the carrier.

W. F. HARVEY.

Reprinted from "Bulletin of Hygiene," Vol. 16, No. 9.

Reviews.

SCABIES. By Kenneth Mellanby, B.A.Cantab., Ph.D. Oxford University Press. London: Humphrey Milford. 1943. Pp. xi + 81 5s. net.

It is always difficult for a scientist who has involved himself deeply in the study of a single disease to write a short, readable and lucid manual on the subject of his researches. Usually, he is sorely tempted to write a monograph full of erudition and packed with references which, although it may be of great value to other specialists, is of little use to the majority of medical men whose interests and responsibilities concern a much wider range than the limited compass of a single disease. Dr. K. Mellanby is to be congratulated, for he has avoided this pitfall and has written a very readable, small, yet comprehensive book which will be of interest both to clinicians and administrators.

"Scabies" is a convenient synopsis of current views concerning the anatomy and life history of the Itch Mite, its bionomics and the signs, symptoms and treatment of the disease which it produces in its host. Two chapters are devoted to a consideration of the incidence and prevention of scabies and the volume closes with a brief account of other mites of medical and veterinary importance. The index and illustrations are satisfactory and an appendix containing miscellaneous formulæ is of interest.

To those who have not read the numerous articles concerning scabies which have been published in the medical press during the past two years, this book will convey much that is new and interesting; those who have been able to read the articles as they have appeared will welcome this opportunity of getting into true perspective the older knowledge and the results of recent researches.

As stated in the preface, the book has been written mainly as a result of work which the Author has carried out during the past two years. During one third of this period, Major C. G. Johnson, R.A.M.C., took a full part in the investigation and there is no doubt that many of the interesting facts and theories which are to be found in the manual originated or were confirmed during this fruitful period of collaboration.

It is still too soon to attempt to assess to what degree subsequent workers will endorse Mellanby's findings and conclusions. Meanwhile, it is certain that those interested in the scabies problem will find this manual to be a useful vade-mecum at the present time.

R. M. B. M.

TEXTBOOK OF SURGICAL TREATMENT INCLUDING OPERATIVE SURGERY.

Edited by C. F. W. Illingworth, M.D., Ch.M.; F.R.C.I.E. Edinburgh: E. & S. Livingstone. 1943. Pp. xii + 528. Price 28s.

Professor Illingworth has, as collaborators in this book, the cream of the Surgical Staff of two famous Scottish schools—Glasgow and Edinburgh. One is therefore entitled to expect a work of outstanding merit even though one may perhaps be justified in quarrelling with the title. With so much talent at his disposal one cannot resist the feeling that a complete manual of surgery would have been of more service to the profession—student and post-graduate alike. How much more convenient it is to the student to find all he requires between the covers of one volume or perhaps two. To require a book devoted exclusively to Surgical Treatment would seem an additional strain—both physical and financial. Although operative surgery is included in the title it receives somewhat scant attention in the text, and will not satisfy the newly qualified “undergoing training in surgery” as the Editor's preface words it. Some subjects, apart from their operative treatment, receive short measure, and gaps occur. Diverticulitis is accorded less than a page and diverticulum of the bladder is accorded exactly as much. One looks in vain for the treatment of stricture of the rectum. There is a noticeable lack of balance—always difficult to maintain where many authors are concerned—in the illustrating of the various sections. The chapter on fractures—a subject which lends itself particularly to visual representation—contains a solitary illustration. One might excuse this on the grounds of war economy if it were not for the fact that the next chapter is furnished with two illustrations in colour—one of Nicola's operation (taken from Watson Jones' “Fractures”) and the other of exposure of the brachial artery (taken from “Surgery of Modern Warfare”). The illustrations on page 368 of Radical Mastectomy are far too small and serve no purpose.

Much of the subject matter of the text is, however, excellent, and fully worthy of the reputations of these two schools, the opening chapter on pre-

operative and post-operative care deserving special praise as does the short account of surgery of the Autonomic System.

The chapter on hernia could not easily be bettered and it is heartening to see simple herniotomy advocated when the musculature is good. The note on post-operative care should, however, be rewritten, for graduated post-operative exercises, as military surgery has shown, are of great benefit. One would like the ligature of the sac as portrayed on page 391 to be placed a little nearer its base—for the correct placing of this ligature is surely the crucial part of all operations for hernia.

The general get up of the book is extremely good despite a world war and the print is clear and pleasing to the eye. The price, 28s., will not be attractive for a book which is a luxury for the student, who would, we are sure, be readier to indulge in such a luxury were a cheap edition made available.

ERRATA.

"Sulphaguanidine in the Treatment of Bacillary Dysentery." By Lieutenant-Colonel Ernest Bulmer, R.A.M.C., and Major W. M. Priest. R.A.M.C.

December Number, 1942.

Page 279, line 11, *delete* "often".

Page 281. Table II, *insert* as first column—

"Severity"			
+			
+	+		
+	+	+	
+	+	+	+

Table II, *insert* "Average" to heads of 2nd, 4th, 6th and 7th columns.

Page 281 first line of second footnote, *for* "inconsistent" *substitute* "incontinent".

Page 282, last two lines of Section headed "(2) Chronic Cases (15)", *for* "sigmoidoscopy showed complete denudation of the mucous membrane." *substitute* "sigmoidoscopy showed a normal mucosa."

Page 286, last line of Section headed "Conclusions." *for* "should there be any doubt that the drug is not specific." *substitute* "should there be any doubt, the drug is not specific."

[It is the impression, however, of one who read the article in MS., galley proof and page proof, that no alteration was made in it except for a few minor changes in punctuation. While regretting that the published paper differs from that in the possession of the author we are unable to admit responsibility in the matter.—EDITOR.]

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in duplicate through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps, and articles of a non-scientific character, may be accepted for publication under a nom-de-plume.

All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps," will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

A free issue of twenty-five reprints, or any lesser number to the extent applied for, will be made to contributors of Original Communications and of twenty-five excerpts, or any lesser number as above, in the case of Lectures, Travels, Clinical and other Notes, and Echoes of the Past. Such free reprints or excerpts will, however, only be sent to those specifying their wish to have them and a request for same should accompany the article when submitted for publication, stating the number of reprints or excerpts required.

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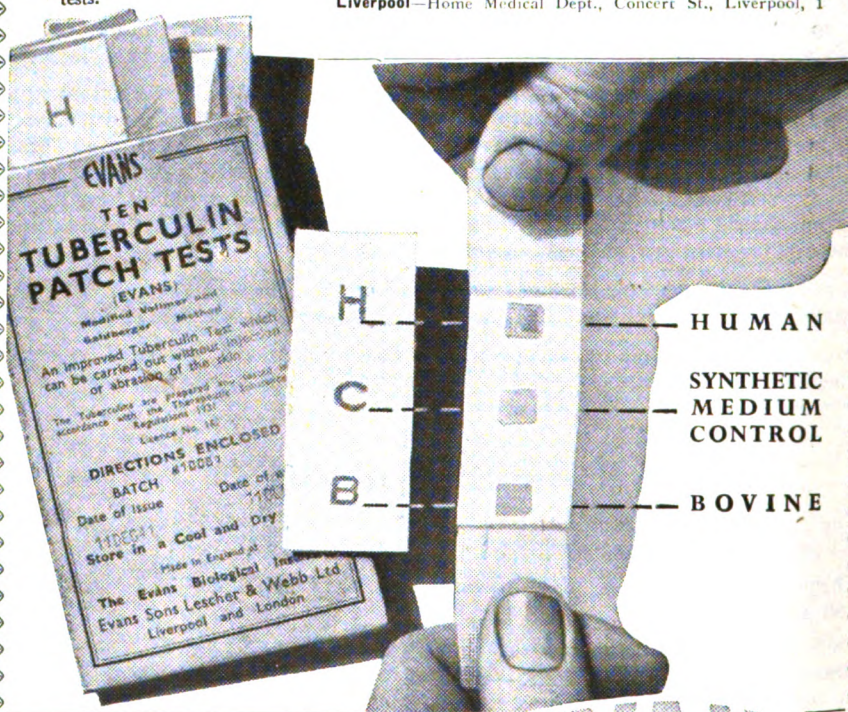
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Corps News.

APRIL, 1943.

EXTRACTS FROM THE "LONDON GAZETTE."

March 18, 1943.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the Middle East :—

The Military Cross.

Capt. William Neville Hind (159527),
Royal Army Medical Corps (Newark).

The Military Medal.

No. 7384960 Pte. Charles Edward
Bahn, Royal Army Medical Corps
(Hull).

March 25.—The KING has been graciously pleased to confer "The Efficiency Decoration" upon the following officers of the Territorial Army :—

Royal Army Medical Corps.

Major (temp. Lt.-Col.) A. M. Hughes,
M.C. (51565).

Major W. Bowater, M.C. (T.A.R.O.)
(16701).

Major H. A. Eccles (40017).

Major C. W. F. Greenhill (T.A.R.O.)
(34362).

Major F. N. N. Roberts (66718).

Major C. J. Fox (51583).

April 8.—The KING has been graciously pleased to approve the following immediate awards in recognition of gallant and distinguished services in North Africa :—

The Military Medal.

No. 2820366 Cpl. John Alexander MacKenzie, Royal Army Medical Corps
(Grantown-on-Spey).

No. 5109214 Pte. Samuel Moffat, Royal
Army Medical Corps (Liverpool).

Memoranda.

March 23.—War Subs. Lt.-Col. (local
Brig.) N. St. J. G. D. Buxton, M.B.,
F.R.C.S. (25883), R.A.M.C., relinquishes
the local rank of Brig. Jan. 22, 1943.

War Subs. Major (acting Col.) F. A. R.
Stammers, M.B., F.R.C.S. (88791),
R.A.M.C., to be a Consulting Surgeon,
and is granted the local rank of Brig.
Dec. 1, 1942.

March 26.—Capt. J. Walsh, M.B.
(57686), to be Major. Jan. 24, 1943.

April 6.—Major A. S. Cane, D.S.O.,
O.B.E., M.D. (11991), having attained the
age limit of liability to recall, ceases to
belong to the Res. of Offrs., April 1, 1943.

Lt. (Qr.-Mr.) E. F. Taylor (71670) to
be Capt. (Qr.-Mr.). Apr. 14, 1943.

April 13.—The undermentioned Con-
sultant is granted the local rank of
Brig. :—

Actg. Col. W. L. Eastwood, M.B.,
F.R.C.S. (191534), R.A.M.C. Sept. 19,
1942.

Regular Army Reserve of Officers.

April 2.—Major P. Hayes, M.B.
(15781), having attained the age of li-
ability to recall, ceases to belong to the
Res. of Offrs., April 1, 1943, and is
granted the hon. rank of Lt.-Col.

THE ARMY DENTAL CORPS.

March 26.—Major (War Subs. Lt.-Col.) (temp. Col.) E. H. C. Caute (32678) to
be Lt.-Col. March 4, 1943.

ANNUAL GENERAL MEETINGS.

The 128th Annual General Meeting of the R.A.M.C. Officers' Widows' and
Orphans' Friendly Society will be held at the R.A.M.C. Headquarter Mess, Mill-
bank, on Thursday, May 20, 1943, at 2.15 p.m.

The Annual General Meetings of the subscribers to the R.A.M.C. Fund and
R.A.M.C. Officers' Benevolent Society will be held in the R.A.M.C. Headquarter
Mess, Millbank, S.W.1, on Thursday, June 3, 1943, at 2 p.m.

The Annual General Meeting of the R.A.M.C. Association will be held in the
R.A.M.C. Headquarter Mess, Millbank, S.W.1, on Thursday, June 17, 1943, at 2 p.m.

REPATRIATION—R.A.M.C. OFFICERS.

The following R.A.M.C. Officers arrived in United Kingdom on April 23, on Repatriation from Italy:—

T/Col. G. P. Kidd.
A/Col. R. D. Davy.
T/Lt.-Col. W. B. F. Brennan.
T/Lt.-Col. J. K. Steel.
T/Lt.-Col. J. T. Lewis.
Major L. F. Richmond.
Major J. L. Martin.
T/Major E. J. Pryn.
T/Major H. L. Thornton.
T/Major E. G. Collins.
T/Major O. G. Prosser.
Capt. A. E. Brewer.

Capt. H. Bloom.
Capt. A. F. Hutchison.
Capt. A. Macfarlane.
Capt. T. C. MacInnes.
Capt. W. L. Petter.
A/Major (Q.M.) J. W. Creamer.
A/Major (Q.M.) H. W. M. Stewart.
Lt. (Q.M.) A. A. Brooks.
Lt. (Q.M.) C. L. Barrett.
Lt. (Q.M.) W. Price.
Lt. (Q.M.) W. Lees.

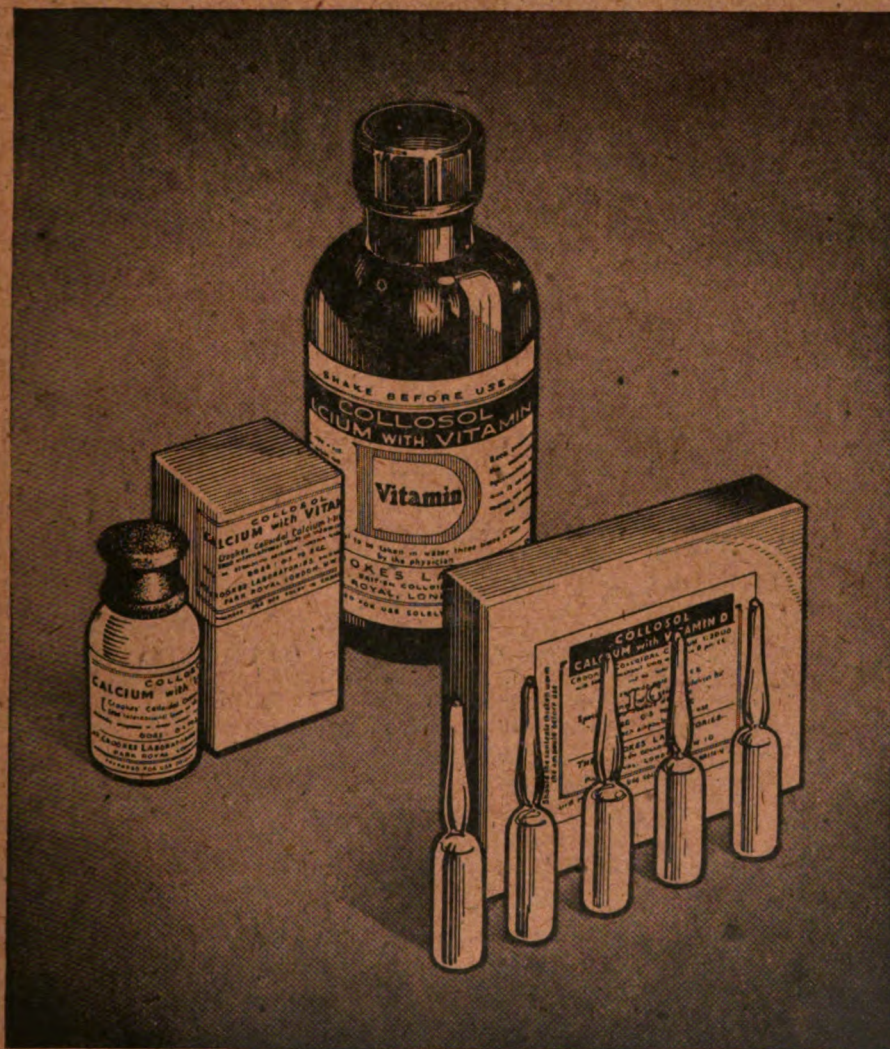
DEATHS.

MACPHERSON.—On March 18, 1943, at Kirkland, St. Martins, Balbeggie, Perthshire, Lt.-Col. John Duncan Graham Macpherson, R.A.M.C., Retired. Son of Lt.-Col. Robert Nasmyth Macpherson, R.A.M.C., he was born Dec. 26, 1873. He took the M.B., Edinburgh, 1896. Commissioned Surgeon Lieutenant Jan. 28, 1898, he was promoted Captain, R.A.M.C., Jan. 28, 1901, Major Oct. 28, 1909, and Lieutenant-Colonel March 1, 1915. He was appointed D.A.D.M.S., West Lancs. Division T.F., Jan. 29, 1914. He retired on account of ill health, Feb. 1, 1921. As a retired officer he was M.O. in charge of Troops at Perth, Jan. 10, 1922, to Oct. 30, 1930, at Carlisle April 1, 1932, till Aug. 10, 1932, and at Lincoln Nov. 1, 1933, till Feb. 6, 1938. He served in France from Feb. 25, 1916, till June 11, 1918, being awarded the British War and Victory Medals. His son, Capt. James Duncan Primrose Macpherson, is serving in the R.A.M.C.

HATTERSLEY.—In King's Lynn, on March 24, 1943, Col. Sidney Martin Hattersley, late R.A.M.C., M.C., M.D. Born March 15, 1888, he was educated at Cambridge and St. Bartholomew's Hospital. He graduated M.B. in 1916 and M.D. in 1931. He took the D.P.H. in 1925. Commissioned Lieutenant, R.A.M.C., Jan. 30, 1914, he was promoted Captain March 30, 1915, Major Jan. 30, 1926, Lieutenant-Colonel Sept. 20, 1935, and Colonel Sept. 20, 1938. He took part in the Balkan Campaign of 1912-1913 as Sur-

geon, Ottoman Red Crescent Society at Scutari. In 1914 he proceeded to France on August 16, but was unfortunately taken prisoner on Aug. 26. Liberated a year later he returned to England but from Aug., 1916, till Dec., 1918, he again served in France. Mentioned in despatches he was awarded the M.C., French War Cross, the 1914 Star and Clasp, British War and Victory Medals. He served in the Middle East from the beginning of the present War to Dec. 6, 1941, and was mentioned in Despatches, *London Gazette*, Dec. 30, 1941.

WARE.—On March 29, 1943, in Paignton, Lt.-Col. George William Webb Ware, D.S.O., M.B., R.A.M.C., Retired. Son of the late George Stawell Ware, formerly of Mallow, he was born Sept. 9, 1879, and graduated M.B. at the Royal University of Ireland in 1905. Commissioned Lieutenant, R.A.M.C., July 31, 1905, he was promoted Captain Jan. 31, 1909, Major Oct. 15, 1915, Lieutenant-Colonel Jan. 29, 1930, and retired Sept. 9, 1934. From Aug. 13, 1937, till Nov. 22, 1940, he was M.O. in charge of the Reception Station, at Canterbury. He served in France, 1914-1915; in Egypt 1915 and 1916; and in France, Italy, and again in France, 1916-1919. Twice mentioned, he was awarded the D.S.O., 5 Class Legion of Honour, French Silver Medal "de la Reconnaissance," the 5 Class Order of St. Maurice and St. Lazarus, 1914 Star, British War and Victory Medals.



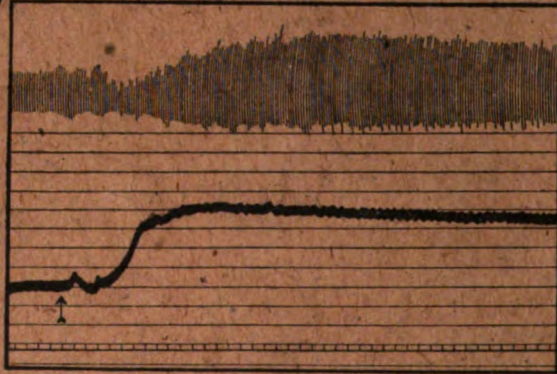
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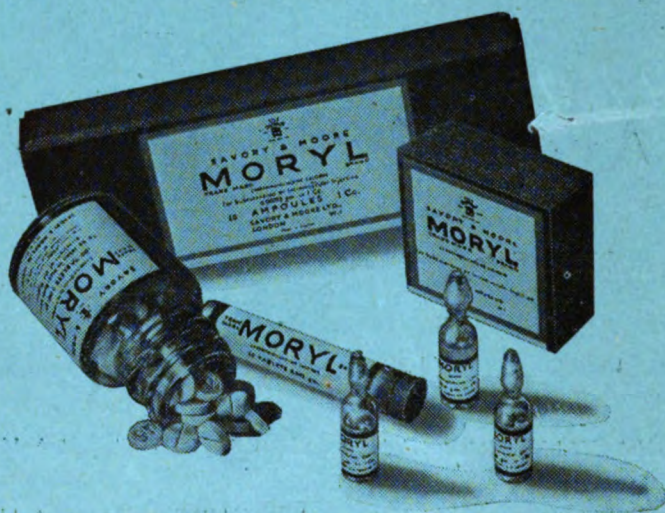
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Journal of the Royal Army Medical Corps.

Original Communications.

SOME PROBLEMS IN THE CHEMOTHERAPY OF PNEUMONIA.

By MAJOR A. L. AGRANAT, M.D., M.R.C.P.(Ed.), D.T.M. & H.

South African Medical Corps.

THE newer chemotherapy has marked an important milestone in the history of medicine, no less important than those derived from the work of Pasteur and Lister. In their scope of application the new drugs far exceed the value of such an irreplaceable chemotherapeutic as neoarsphenamine. It now becomes almost inconceivable how we countered bacterial infections before the introduction of the sulphonamides and it is equally difficult to appreciate how we could possibly practise the art of medicine without these drugs to-day. It has been said that the discovery of the sulphonamides will save more lives than wars can destroy. One time dangerous diseases with high mortality rates have now lost their terror both for patient and doctor alike and amongst the more important of these—pneumonia—at one time honoured with the term “captain of death” has been reduced to a very much less formidable enemy of man. The sulphonamides have completely revolutionized our ideas on the treatment of pneumonia and no differences of opinion exist to-day as to the treatment in this disease, which is probably the best evidence available for the value of the drug.

Prior to M & B 693 being placed on the market I was privileged to take part in a clinical experiment, half the number of patients being treated with this new drug whilst the other half acted as controls. The early recovery of the treated cases as compared with the less fortunate controls was at that time a revelation but is to-day just taken for granted as the

normal course of events. The experimental stages are now past history and no question exists as to the specific action of M & B 693 in pneumonia.

The mere introduction of M & B 693 has removed the biggest problem of this disease—the high mortality rate. Problems in the application of the drug still exist; these have become more evident as our experience in the treatment of pneumonia has grown. I propose to discuss some of these features. The following are some of the problems in the chemotherapy of pneumonia which I propose to discuss.

- (1) Economy in the use of M & B 693 in pneumonia.
- (2) Treatment of influenzal and broncho-pneumonia.
- (3) The place of other sulphonamides in the treatment of pneumonia.
- (4) Toxic effects of the drug and complication of the disease.
- (5) Prolonged pyrexia.
- (6) Analysis of deaths in relation to treatment.

ECONOMY IN THE USE OF M & B IN PNEUMONIA.

The approach to this problem has been prompted by the available supplies of the drug at present and the likelihood of further economies having to be effected. Its free use has already been restricted in gonococcal infections, the dosage for meningitis must be liberal, and the question of possible economy in the treatment of large numbers of cases of pneumonia has been considered. This problem is closely linked with the precise action of the sulphonamides. Attempts at obtaining a solution to the problem have been made by *in vitro* and *in vivo* experiments. At present the answer appears to be that the sulphonamides interfere with the metabolism of the bacteria by either neutralizing the effect of the enzyme or by destroying the metabolite on which the organism feeds. In *in vitro* experiments it would appear that organisms die out slowly when in contact with a sulphonamide, sterilization taking about twenty-four hours to be complete. Fleming has however shown that in the presence of leucocytes organisms will be killed rapidly when in contact with the drug. These latter conditions would appear to resemble more closely the biochemical changes occurring in man. If the drug produced a rapid bacteriostatic effect, it would be reasonable to suggest that the return of the temperature to normal coincided with the death of the organisms and hence the drug could be discontinued when the temperature reached normal. Under these circumstances early withdrawal of the drug after the temperature reaches normal should be a fairly safe procedure. If this view is correct, it should result in a considerable saving of the drug, since a quantity approaching that used in the pyrexial period is not infrequently used in the apyrexial stage. More than a year ago I had the opportunity of putting this view to the test and in a small group of cases of African patients it was noted that the results were encouraging in that relapses in these cases were few (Agranat). Another feature which struck me at that time was that the average African patient appeared to be even

more responsive to M & B 693 than the average European; an acutely ill African patient appeared to respond rapidly to the drug, the temperature frequently reaching normal within twenty-four hours. During recent months I have once more had occasion to treat African patients and I have again tried out the curtailed form of treatment.

On my suggestion a number of cases in hospital were placed on the "short course treatment" which consisted of avoiding high initial or loading doses and of discontinuing treatment as soon as the temperature returned to normal. The remaining cases during the same period under review had the usual prolonged course of treatment and these acted as a control group in this experiment.

The records of 185 patients seen over a period of two months were reviewed, 89 cases being given the "short course treatment" (Group A) while 63 had the "long course treatment" (Group B) and acted as the control group. The remaining cases not included in these two groups were 14 cases of bronchopneumonia treated first with sulphanilamide and 5 cases of pyrexia of more than seven days' duration. Fourteen deaths were also excluded from this review because 5 cases had on the whole very prolonged courses of treatment and 8 cases on the average had very little treatment, dying soon after admission.

Groups	Number of cases	Temperature normal in 24 hours		Average pyrexial period in days	Treatment continued after fall of temperature in days	M & B 693		Relapses				
		No.	per cent.			Average dose per case	Additional dose after normal temperature	No.	per cent.	Average period of relapse in days	Average dose of M & B 693 per case	Additional dose after normal temperature
Short course treatment (Group A)	89	50	56	1.5	Nil	9 grm.	Nil	15	17	1.5	13 grm.	4 grm.
Long course treatment (Group B)	63	49	78	1.3	1.5	16 grm.	7 grm.	12	19	1.5	12 grm.	3 grm.

The object of this investigation was to compare the results of the short course and long course treatments. The detailed calculations are omitted for the sake of brevity and the results are shown in the accompanying table. The temperature in Group A (short course) and in Group B (long course) fell to normal in twenty-four hours in 56 and 78 per cent. respectively, the average pyrexial period being 1.5 and 1.3 days respectively. No further treatment was administered in Group A after the fall of temperature whereas, in Group B, the cases were treated for an extra average period of 1.5 days on the basis of 6 grams of M & B 693 per twenty-four hours. The average dose in Group A was 9 grams, as compared with 16 grams in Group B. The relapse rate was 17 per cent in Group A and 19 per cent in Group B. The

average relapse period in both Groups was 1.5 days and the corresponding average doses were 13 grams M & B 693 for Group A and 12 grams for Group B. The short average period of relapse—1.5 days—responded rapidly to the second course of M & B in both Groups alike. A point of interest is that a relapse may occur in the presence of full doses of the drug which is therefore no guarantee against such a relapse. The larger figures in the table have been calculated to the nearest whole number and the smaller ones to the nearest decimal figure. Another point is that a rise of temperature below 100° is not considered as a relapse or recrudescence as such a peak is quite common after the temperature has settled and invariably remains down without further sulphonamide treatment. The relapse usually responds fairly rapidly to a second course of treatment.

It may be said that timid use of the drug is as much a mistake as its use in excess. The above investigation would indicate that in the average African suffering from pneumonia the short course treatment should suffice and a considerable economy of the drug could thus be effected. In the case of a patient whose powers of resistance appear to be depleted treatment may be continued for a day or longer whilst the patient is apyrexial but the above figures do not indicate that there is any special benefit in this procedure.

These remarks refer only to African patients who as I have already remarked appear to be even more responsive to the effects of M & B 693 than the European. Similar procedure of treatment in the European could only be advised after further evidence is available; in most of my European cases during the past twelve months I have advised discontinuing M & B 693 after twenty-four to thirty-six hours apyrexial treatment.

INFLUENZAL AND BRONCHO-PNEUMONIA.

From a chemotherapeutic aspect the only satisfactory classification of pneumonias is on a bacteriological basis. Anatomical classification has no place in modern therapeutics though it may be of value in the clinical description of the pneumonia and to the pathologist. Influenzal pneumonia is a wide term and may mean anything from a voluminous and deeply congested lung to a lobular or lobar consolidation. True influenzal pneumonia is caused by the virus of influenza. These cases are extremely fatal and usually unresponsive to M & B 693. In most cases, however, influenzal pneumonia is due to the secondary invaders, the pneumococcus, the streptococcus or a mixed flora with Pfeiffer's bacillus, the non-hæmolytic streptococcus and the *Micrococcus catarrhalis*. It is impossible on clinical examination to know which of the organisms are concerned with a pneumonia complicating influenza. Elaborate bacteriological investigations take time and such facilities are not always available. It appears to be a common belief among a number of clinicians that the offending organism in influenzal or broncho-pneumonia will respond to sulphanilamide. This may be true for a certain number of cases but certainly does not refer to most cases. It is incorrect to assume

that a particular organism is responsible for a particular type of pneumonia classified on an anatomical basis. Sulphanilamide may be of value in a case due to the hæmolytic streptococcus but to await the result of a bacteriological investigation means the loss of valuable time. Douthwaite recommends that sulphanilamide be used for twenty-four hours and, if no improvement occurs, he advises changing to M & B 693. I cannot see any advantage in this procedure. In this series of 185 cases 8 out of the 14 diagnosed as bronchopneumonia were unsuccessfully treated with sulphanilamide for periods varying from two to six days before being changed over to M & B 693; 7 out of these 8 cases then responded to the latter drug. The same remarks apply to the bacteriology of bronchopneumonia. In view, therefore, of the uncertainty of the bacteriology in cases of influenzal or bronchopneumonia it is advisable to use only M & B 693 in all these cases and avoid the use of sulphanilamide.

THE PLACE OF OTHER SULPHONAMIDES IN TREATMENT.

I have had very little experience of the newer drug sulphathiazole, better known as M & B 760, and none with sulphadiazine, a more recently introduced preparation. From reports however it would appear to be that sulphathiazole is less nauseating and much less likely to produce vomiting than M & B 693 though equally effective. Owing to the rapid excretion high loading doses are advised. Sulphadiazine has similar advantages, and in addition its toxic effects are said to be very mild (Billings and Wood). The relative value of these preparations can be gauged from a recent publication (Stable) of an analysis of 15,000 cases of pneumonia. The mortality rate in 9,195 cases treated with M & B 693 was 8.1 per cent., in 3,666 treated with sulphathiazole the rate was 8.2 per cent. and in 52 cases treated with sulphadiazine the mortality rate was 11.5 per cent. The author concludes that all cases of pneumonia should be treated with sulphathiazole.

Under the present conditions supplies of these newer sulphonamides would not be readily available nor do they appear to have any advantage over M & B 693 in the African. The African patient is on the whole very tolerant to M & B and in the occasional case in which vomiting is troublesome the tablets may be replaced by injections.

TOXIC EFFECTS OF THE DRUG AND COMPLICATIONS OF THE DISEASE.

Toxic Effects.—The only serious problem arising from the possible toxic effects of the drug is in those cases showing toxic psychosis. In this series six such cases were encountered of whom two died. It is difficult to assess how much of this toxic state is due to the infection and how much to the drug. In general terms the drug should be discontinued as soon as the temperature reaches normal or, if adequate dosage has been maintained, for about five days without the temperature returning to normal. The only other

toxic effect of the drug in this series was in a case of hæmolytic anæmia in which the hæmoglobin fell from what appeared to be a normal level on admission to about 50 per cent. in two days. Agranulocytosis need not be feared as it seldom appears under fourteen days and blood counts as a routine are therefore rarely necessary during the treatment of a case of pneumonia. Urinary manifestations are also singularly absent.

Complications.—These too are comparatively rare and are not a major problem. In the series under review there were four cases of toxic jaundice, seven cases of pleural effusion requiring aspiration and four cases of empyema. A toxic jaundice usually indicates a severe infection. At one time jaundice was considered to be a contra-indication to the use of the sulphonamides but it has since been realized that the logical procedure is to eliminate the infection causing the hepatitis and hence M & B 693 should be administered in full doses. The four cases in this series recovered though another such case admitted since then died after a few days' treatment.

Small sterile effusions are fairly common and usually absorb on their own account. Following aspiration in 7 cases the residual temperature disappeared. The incidence of empyema occurring with M & B 693 is no higher than it was before the drug was introduced. One of the 4 cases of this series in whom aspiration had been done whilst waiting for the pus to thicken died rather suddenly and unexpectedly following a convulsion. Although a post-mortem was not done it was thought that he might have had a metastatic cerebral abscess.

CASES OF PROLONGED PYREXIA.

These cases form one of the major problems in the chemotherapy of pneumonia. If the infection does not respond to ample dosage of the drug for three days it is my opinion that the sulphonamides will not effect a cure. The drug is however seldom discontinued during the primary pyrexial period however unconvinced one may be of its value after it has been administered without effect for a few days. It is not infrequently stated that the incidence of prolonged pyrexias following the use of M & B 693 is greater than in the days when natural resolution occurred; this is open to doubt. These cases are usually labelled as unresolved pneumonia and treatment with M & B 693 is continued for prolonged periods in many cases, usually with little or no benefit. The proof tendered in support of a diagnosis of unresolved pneumonia is the physical signs of consolidation in the lobe or lobes originally involved. This is in fact no proof for in all cases of pneumonia although the temperature has settled the pathological process in the lung proceeds through the usual stages to resolution. These signs may be present for several weeks and are therefore no evidence that the temperature is due to an unresolved pneumonia, which diagnosis is made too often. Davidson has recently remarked that "a warning is necessary as to the continued abuse of the expression—unresolved pneumonia." No doubt this condition does exist but before this diagnosis is made the case must be

reviewed on a systematic basis to exclude any other cause for the temperature. Amongst the possible causes to be considered are the following:—

Extension of the Pneumonia.—This may occur during the administration of the drug or it may appear in a relapse. In the latter instance it is probably due to a different type of pneumococcus. Extension during treatment is always a puzzling occurrence and makes the action of the drug difficult to understand. Under these circumstances it is necessary to continue giving the drug in full doses even though it has already been administered for two or three days.

Tuberculous Pneumonia.—The sputum in every case of persistent pyrexia should be examined for T.B. No cases of tuberculous pneumonia appeared in this series although one such has occurred since and I have also previously met this as a cause of the continued temperature.

A Pneumococcus Unresponsive to M & B 693.—This too is a comparatively rare finding but occurs more frequently than T.B. Three such cases appeared in this investigation, a natural resolution occurring on about the seventh day. M & B 693 was in one case administered for four days and in two others for six days without making any impression on the temperature. There is always a tendency in these cases to continue with the drug in the hope that the particular case treated may prove an exception. It is most unusual to find a case responding to the drug after three days. The organism which in these cases is unresponsive to the sulphonamide appears to be a particular type or strain of pneumococcus or the non-hæmolytic streptococcus or the mixed flora found in some cases of influenza. The condition is not caused by drug-fastness, which, however, may be induced by small doses over long periods.

Pneumonic Complications.—Amongst the commonest causes for a prolonged pyrexia are pleural effusion, empyema, lung abscess (particularly small multiple lung abscesses), pericarditis, arthritis, meningitis and septicæmic pneumonia. A very common cause for a moderate pyrexia is a small collection of fluid in the pleural cavity. Physical signs may be misleading; an exploration should invariably be performed whenever residual lung signs persist with a temperature. A pericardial rub should be listened for and the joints examined. Headache and pains in the back may be signs of an early pneumococcal meningitis. Two such cases complained of these symptoms for several days before developing neck rigidity. Early lumbar puncture should be done. Bone complications are rare but in one case a pure culture of pneumococcus was obtained from a case of osteo-periostitis of the tibia following a lobar pneumonia. Pneumococcal endocarditis may complicate a septicæmic pneumonia though this is a rare finding.

PERSISTENT PYREXIA DUE TO OTHER DISEASES COMPLICATING THE PNEUMONIA.

Malaria.—A single peak of temperature of 101° to 104° F. often occurs after the temperature has settled and appears to be due to malaria in most

cases. Often such a temperature in the presence of the residual signs in the chest is incorrectly ascribed to a relapse and the patient is again given M & B 693. Diagnosis of a relapse is only justifiable if the temperature is accompanied by an increased respiratory rate and blood-stained sputum in addition to the signs in the chest.

Amœbiasis.—It would appear to be a coincidence that two or probably three of the four cases of prolonged pyrexia still in hospital have been due to this cause, the temperature having responded to the appropriate treatment. In one case anchovy paste sputum gave a pointer to the diagnosis and in the others the liver was somewhat enlarged and tender. In no case were amœbæ recovered.

Case No. 26892 is an example of pneumonia with amœbiasis. Admitted on March 30, 1942; with rigors, cough and abdominal pains. Rales present at right base. On April 9 temperature rose to 103° F. with consolidation at right base. Six grams M & B 693 prescribed daily for nine days. Temperature remittent. Treatment repeated on April 24 for three days. Total dose 72 grams. On April 26 saw patient coughing up anchovy paste sputum. Emetine produced subsidence of the temperature in three to four days. X-ray showed a funnel shaped shadow on the right diaphragm fanning out into the lung; the appearances were highly suggestive of an abscess from the liver perforating the diaphragm.

Another case had a temperature for nearly two months following his pneumonia. A leucocytosis and remittent temperature ranging from normal in the morning to 104° F. in the evening strongly suggested a pocket of pus somewhere. Repeated explorations and X-rays of the chest excluded this as the source. Liver abscess was suspected but no pus was found by the surgeon. His condition is improved, his temperature has returned to normal and the physical signs at the right bases have disappeared. It is very likely that the condition has been due to an amœbic hepatitis as originally considered.

Intercurrent Infections.—There is no reason why a patient may not be suffering from any other disease which may become manifest after the pneumonia has settled. Appropriate investigations should be undertaken.

Unresolved Pneumonia.—Only after all the above possibilities have been considered and excluded should this diagnosis be made. X-ray will show some loss of translucency. Two such cases have occurred in this series, taking about six weeks to settle. Sulphonamides do not hasten resolution.

On review of the possible causes of a continued pyrexia it becomes apparent that very few of these cases require more M & B 693, extension of the pneumonia and pneumococcal meningitis being exceptions. The ineffectiveness of the sulphonamides in the presence of an effusion or collection of pus should be borne in mind. Considerable economy in the use of M & B 693 could also be effected in a large number of these cases of prolonged pyrexia.

ANALYSIS OF THE DEATHS.

Fourteen deaths occurred during the period under review giving a mortality rate of 7.5 per cent. These include seven cases who died within

twenty-four hours, some of them practically on admission, before any or more than the first few doses of the drug could be given. Three died from lobar pneumonia, two from bronchopneumonia, eight from influenzal pneumonia and one from an empyema.

3 Cases of Lobar Pneumonia.

Case 1.—Admitted 15.2.42. Consolidation R.L.L. Had 42 g. M & B 693 and 32 g. sulphanilamide. Died 1.3.42. P.M., right lower lobe honeycombed with small abscesses.

Case 2.—Admitted 21.2.42. Consolidation L.L.L., pyrexial for three weeks. Had 92 g. M & B 693. Died 12.3.42. No P.M.

Case 3.—Admitted afebrile on 7.4.42. Bilateral basal pneumonia diagnosed four days later. Had 7 g. M & B 693. Died same day. No P.M.

2 Cases of Bronchopneumonia.

Case 4.—Admitted 19.3.42. Pyrexial five days. Had 34 g. M & B 693. Died 24.3.42. No. P.M.

Case 5.—Admitted 18.3.42. Pyrexial nine days. Had 18 g. M & B 693; discontinued owing to toxic psychosis. Died afebrile one week later. P.M., bilateral lobular pneumonia.

8 Cases of Influenzal Pneumonia.

Case 6.—Admitted 3.3.42. Had 6 g. M & B 693. Died twelve hours after admission. P.M., influenzal pneumonia.

Case 7.—Admitted 4.3.42. Had 4 g. M & B 693. Died six hours after admission. No P.M.

Case 8.—Admitted 25.3.42. Had 3 g. sulphanilamide. Died eight hours after admission. P.M., influenzal pneumonia with suprarenal hæmorrhage.

Case 9.—Admitted 10.3.42. Died on admission. P.M., influenzal pneumonia.

Case 10.—Admitted 29.3.42. Had 6 g. sulphanilamide. Died eighteen hours after admission. No P.M.

Case 11.—Admitted 18.3.42. Had 24 g. M & B 693. Toxic psychosis. Temperature normal two days before death. No P.M.

Case 12.—Admitted 22.4.42. No M & B. Died fifteen hours later. P.M., influenzal pneumonia with suprarenal hæmorrhage.

Case 13.—Admitted 22.4.42. No M & B. Died fifteen hours later. P.M., influenzal pneumonia with suprarenal hæmorrhage.

Case of Empyema.

Case 14.—Admitted 15.4.42. R.L.L. consolidation. Temperature responded to 12 g. M & B 693, with recurrence. Chest explored 27.4.42. Watery pus aspirated. Pus of similar consistence aspirated on 1.5.42. Died following fit on 35.5.42. No P.M., but trend of events suggested death from a metastatic brain abscess.

Deaths occurring within the first few days of pyrexia are due to a peripheral vascular failure produced by toxæmia of the pneumonia. These are the cases in which M & B 693 fails. When pyrexia is prolonged and no other cause can be found to account for this, death is not infrequently due to multiple small abscesses in the lobe involved, as illustrated by Case 1; this type of case is usually diagnosed as "unresolved pneumonia." The prognosis in bronchopneumonia is no different to that of lobar pneumonia excepting where the age of the patient is a factor; in both these types

of pneumonia the prognosis is entirely dependent upon the response of the organism to the drug. Most of the deaths in this series were caused by influenzal pneumonia to which the African is particularly vulnerable. M & B 693 has little if any effect on the virus of influenza. It is interesting to note that the P.M. findings are not infrequently associated with hæmorrhage into the suprarenals.

I would say on review of the deaths that it would appear that none of these could have been avoided. The only feature to be noted was the apparent unnecessary prolongation of M & B 693 (70 to 90 grams in several cases).

In conclusion it has become apparent that since the introduction of the sulphonamides problems in treatment have changed from those concerned with a high mortality to those dealing with prolonged pyrexia, complications and such questions as dosage. In connexion with the last named a considerable saving of the drug could be effected as has been indicated. This also applies to the treatment of prolonged pyrexias. Before the diagnosis of unresolved pneumonia is applied very full investigations and repeated examinations must be done to exclude any of the other and more frequent causes of continued pyrexia. The application of the newer drugs is of interest but under present conditions of little practical advantage over M & B 693. I regret that owing to time factors I have been unable to make this review a wider one. Under the circumstances I have tried to present a few problems in connexion with the chemotherapy of pneumonia as particularly reflected in my recent experience with the African patient.

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FIVE HUNDRED CASES OF MYALGIA IN THE ARMY.

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JUDGING by textbooks, muscular diseases are very uncommon. But this is hardly in harmony with the fact that the musculature—the so-called active locomotor apparatus—is the largest organ of the body. According to Mackenzie (1930) the animal body contains not less than 434 muscles, which constitute about 45 per cent of the total weight. Moreover the musculature contains about one-third of the total blood (McDowell, 1938). Further one has to bear in mind that the muscles are subject for the greater part of the day to wear and tear to a great extent. From a purely theoretical point of view the muscles must be expected to be subject to frequent diseases.

I submit that muscular diseases are very frequent indeed. Their recognition has been probably delayed owing to the fact that they give rise to referred or heterotopic (Waterston) pain. This fundamental fact regarding muscle physiology was found only very recently, viz. experimentally (Lewis and Kellgren 1938) and clinically (Good 1938). The frequent muscular disease in question is called myalgia and is present in and responsible for pain complained of by the vast majority of people suffering from what is generally called rheumatism and in a number of other minor diseases. Myalgia is a disease the cardinal symptom of which is pain associated with more or less disturbance of function. Since the disturbance of function, i.e. locomotion, is solely due to pain which is aggravated by contraction of the affected muscle or muscles, myalgia may be looked upon as the prototype of the Disease of Pain ("La maladie de la douleur," Leriche, 1939).

Since pain in such conditions is practically the only symptom that counts, one has to bear in mind that it is a *subjective* phenomenon; it may be added that local tenderness, too, is solely subjective. Moreover, experience has shown that there exist *normosensitive*, *hypersensitive* and *hyposensitive* individuals or patients with regard to pain, probably owing to the fact that the threshold of pain differs individually. But to my mind, medicine is, or ought to be, practised on the lines of an applied science. It must, therefore, be our endeavour to base our diagnosis on objective criteria whenever possible. In the case of myalgia the diagnosis can be based on objective phenomena.

Definition.—Myalgia is a muscular disease localized in well-definable parts of a muscle and its appendages—tendon, ligaments, perimysium, fascia—corresponding anatomically to the origin, insertion, the course or the edge

of a muscle. It may affect one (monomyalgia) or several muscles (poly-myalgia) and is characterized by the following symptoms:—

Subjective Signs. (1) *Character of Pain.*—A dull aching, sometimes agonizing pain, occurring in attacks of a few minutes' duration or longer with long intervals. The pain phenomena consist of two kinds, a deep pain, which cannot be localized properly, and a superficial type which is localized, at least approximately, by the patient. The pain is aggravated by contraction and relieved by relaxation of the affected muscle or muscles. Sometimes it increases during sleep to such a pitch as to awaken the patient. Not rarely pain or ache occurs in the early morning when starting work and slowly works off.

(2) *Heterotopicality of Pain.*—The painful areas as described by the patient are of a referred character and therefore misleading with regard to the localization of the diseased muscle.

(3) *Neuralgic Symptoms.*—Paræsthetic sensations, numbness, pins-and-needles, are often complained of, especially in hands and fingers or feet and toes.

(4) *Disturbed Function.*—Diminished or temporary loss of power in a special muscle or muscle group, e.g. dropping things from the hands or giving way of knees. A very frequent complaint is stiffness, which seems to be akin to diminished strength of a muscle or muscle group.

The objective signs centre round what I term "myalgic spots," well and objectively defined areas at the origin, insertion, along the edge or in the course of a muscle, which are as a rule harder to the touch than the surrounding area. Well-defined nodules may or may not be felt in the substance of the muscle (not to be confused with rheumatic *subcutaneous* nodules).

Objective signs.—(1) Pressure on a myalgic spot elicits a severe and extremely agonizing pain which is often similar in character and extent to the spontaneous pain complained of.

(2) Pressure on such a spot produces wincing pain associated with an involuntary movement, e.g. jerking of head or shoulder in a part of the body, not pressed upon, or the patient "makes a face." This sign is *pathognomonic*.

(3) The myalgic spots, of which the patient is absolutely unaware, do not coincide with the painful skin area complained of and, in fact, are often far removed from it.

(4) In the area of referred pain the skin is often hyperalgesic to pin-prick and light pressure, e.g. from a hot-water bottle.

(5) After appropriate treatment, applied to myalgic spots only, the local pain elicited by pressure, as well as the referred pain, disappears.

From a clinical point of view, three different kinds of myalgia may be distinguished, viz. (a) *rheumatic* myalgia giving rise to pain referred to those

parts of the body which, by common medical usage, are supposed to be subject to rheumatism; (b) *traumatic* myalgia, viz. cases where the complaints can with certainty be traced to a recent or previous injury, usually of an indirect nature; (c) *idiopathic* myalgia. It is of unknown origin and rather vaguely defined by negative criteria: it causes severe pain or ache in some part of the body—heart, abdomen, feet, many forms of so-called neuritis—which are not supposed to be subject to rheumatism nor due to an injury.

Myalgia may be (1) an acute, (2) sub-acute or (3) chronic disease.

It is of the utmost practical importance to impress on the profession that myalgia is an extremely common and widespread disease present in many patients frequenting the surgeries in town and country.

Rheumatic myalgia is present in and responsible for the vast majority—according to statistics mentioned in an earlier paper (1938) 95 per cent (!)—of all patients suffering from what is generally called rheumatism.

In addition, it must be borne in mind that both rheumatoid arthritis as well as osteoarthritis are not rarely, and rheumatic fever commonly, associated with myalgic conditions in the muscles near to or even farther away from the affected joints. It may not be out of place here to stress the fact that rheumatic myalgia, provided it is properly diagnosed and accurately located, is a disease which can be cured with certainty. For practical purposes it appears sufficient to describe here only the myalgia of those muscles which are most commonly affected.

REFERRED PAIN FROM MUSCLE.

Before proceeding to the description of special myalgias, I would like to emphasize the pain phenomena accompanying this very frequent muscular disease. The most amazing fact is that a diseased muscle—similar to a diseased viscus—may give rise to referred pain. This fundamental fact regarding the physiology of muscle pain was only discovered recently. It is conditional for the understanding of the symptomatology and the diagnosis of myalgias. From my experience as a patient I can say that the pain phenomena consist of (1) a deep dull pain which as a rule cannot be localized by the patient and (2) a more superficial pain or paræsthesia, which may be localized, at least approximately. The latter is heterotopic or referred in character, is often localized far away from the affected muscle, especially in the thigh and follows a segmental pattern. Clinical observations made over hundreds of cases have shown that pain as mapped out by the patient himself is delineated, at least approximately, on skin areas supplied by segments of the spinal cord—so called dermatomes—and as a rule originates in muscles supplied by the same segments. But it is worth mentioning that this rule of dermatomes, although true only approximately, enables us to find and locate the myalgic spots in the muscles causing and responsible for the pain or ache or stiffness complained of. The cutaneous areas of the skin innervated

by the different spinal nerves are shown in fig. 1. The localization of the myalgic spots in the muscles most commonly affected are shown in fig. 2.

CLINICAL FEATURES OF SOME IMPORTANT MYALGIAS.

Trapezo-myalgia. Myalgia of Neck.—Pain is usually referred to the neck and shoulder but sometimes to the occiput extending to the top of the head. The skin areas of referred pain are C_2 — C_4 . Pain is aggravated by

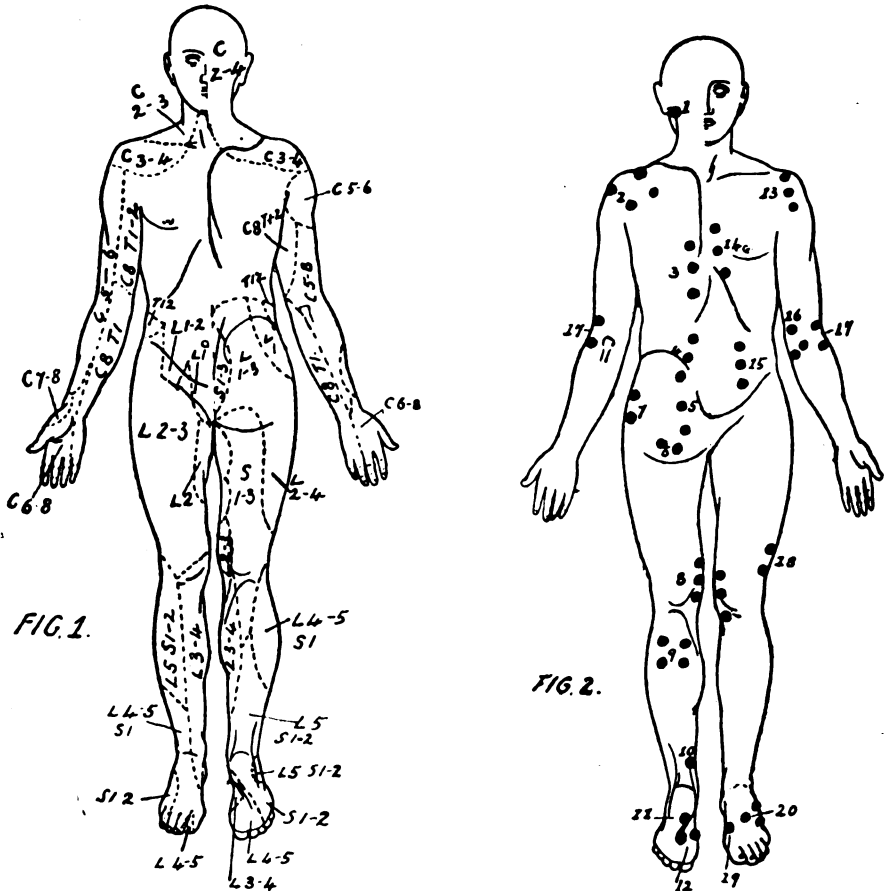


FIG. 1.—Cutaneous areas supplied by different segments of the spinal cord (dermatomes).

FIG. 2.—Localization of myalgic spots in very common myalgias.

Dotted lines = areas of pain as mapped out by patients.

•• = myalgic spots.

1, Sternomastoid; 2, trapezius; 3, sacrospinalis; 4, quadratus lumborum; 5, gluteus medius; 6, gluteus maximus; 7, tensor fasc. lat.; 8, semimembrandin.; 9, gastrocnemius; 10, tendo Achillis; 11, plantaris; 12, tibialis ant.; 13, biceps tendon; 14, major pectoral; 15, rectus abdominis; 16, flexors; 17, extensors of wrist and fingers; 18, lateral vastus; 19, abductor hallucis; 20, peroneus brevis.

movements of the trapezius and relieved by its relaxation. Trapezo-myalgia causes acute and sub-acute stiff neck and shoulder ache. Sometimes it is responsible for *occipital headache*. It is usually rheumatic but can often be traced to a trauma. It is noteworthy that *giddiness* is not rarely due to this form of myalgia: idiopathic myalgia of the trapezius giving rise to *muscular vertigo* (Good 1940).

Omomyalgia. Myalgia of Shoulder.—Pain is usually referred to C4—5, rarely to C.6. Movements of shoulder are restricted. Active and passive movements are extremely painful. This myalgia often simulates arthritis, periarthritis or bursitis of shoulder. Often the malady is of traumatic origin. The myalgic spots are as a rule located in the trapezius and/or the tendon of long head of biceps. Rarely there are in addition myalgic areas in the border of the deltoid.

Myalgia of Elbow. Cubital Myalgia.—Pain is referred to outer aspect of arm and hand and I—III fingers (external myalgia) or to the inner aspect of arm and hand and III—V fingers (internal myalgia). Myalgic spots can be located in the heads of extensors or flexors of wrist and fingers or in both. Sometimes the origin of the brachioradialis is also affected and simulates what is often diagnosed brachialgia. Cubital myalgia often gives rise to *paræsthesia*—pins-and-needles, numbness, etc., temporary loss of or diminished power, e.g. dropping things from hands. In my experience it is responsible for and present in some cases of peripheral neuritis.

Precordial Pain.—In my experience heart pain complained of by patients with a normal cardiovascular system is, *as a rule, of muscular origin*. Muscular pain referred by patients to the heart may also be present in some organic diseases of the heart (Good, 1940). Two forms can be distinguished:

(a) *Mammary Pain.*—Pain is referred to a skin area—usually oval in shape—above or around the nipple, mostly to the left, but sometimes to the right side. The myalgic spots are as a rule found in the origin (ligamentous part) of the sterno-costal part of the major pectoralis near the sternum in the III—V intercostal spaces.

(b) *Infra-mammary Pain.*—Pain is referred to an oval skin area below the nipples—right or left; sometimes also across the costal arch and upper part of the hypochondrium. Myalgic spots are localized in the outer edge of the sacrospinalis (right or left) and rarely in the origin of the major pectoralis from the lower ribs.

Both types of what is called by patients heart pain is aggravated by deep breathing. Patients are therefore inclined to develop a type of shallow breathing.

Rectus Myalgia. Myalgia of Abdomen.—This form of myalgia is of great practical importance since it gives rise to pain referred to the upper and/or lower abdominal region on the right or left and thus may simulate a visceral disease of the abdominal cavity. A very characteristic almost pathognomonic feature is the point that pain is aggravated by bending and/or lifting heavy

weights. The myalgic spots are usually localized in the *outer* border of the rectus abdominis in its upper or lower parts. It often is of unknown (idiopathic) origin but can sometimes be traced with certainty to a trauma.

Dorsal and Lumbar Myalgias.—Pain is referred to the back below the scapular spine down to the lumbar region or to the small of the back. Pain is aggravated by stooping, bending or inspiration. Myalgic spots in the outer edges of the erector trunci (sacrospinalis) on one or both sides are responsible for high backache and for pleurodynia. Dorsal myalgia often simulates intercostal neuralgia and neuritis. In lumbago the myalgic spots are regularly found in the border of the *quadratus lumborum* mostly to the right and left. Rarely they are found on one side. The procaine injections in lumbago are best given in a tangential direction from the flanks, the patient sitting on a locker with legs hanging down and arms crossed but not supported by legs.

Sciatica. Myalgia of Hip.—My experience in the Army seems to show that the syndrome of sciatica is in the vast majority of cases caused by a polymyalgia of hip muscles—coxal myalgia. The myalgic spots are, as a rule, localized in the quadratus lumborum, glutei and tensor fasciæ latæ. *Muscular sciatica* seems to be a suitable designation of this form of the malady, in contrast to true or nervous sciatica which in my experience is rare. The explanation of the fact that a myalgia of the hip muscles just mentioned causes pain referred to the posterior aspect of thigh and leg is apparently due to the rule of dermatomes: the quadratus lumborum is supplied by L 1—4, gluteus maximus by L 4—5 and S 1—2, gluteus medius and tensor fasciæ latæ by L 4—5 and S 1, viz. segments of the cord supplying the posterior aspect of the leg (fig. 1).

It is worth stressing that muscular sciatica can be cured with certainty by appropriate injections of procaine into the accurately located myalgic spots. In the Army I have treated 50 cases of hip-myalgia showing the syndrome of sciatic pain. All but one could be cured within a few weeks. It is noteworthy that in hip-myalgia pain may be referred to thigh and groin only, although the myalgic spots are almost the same as in sciatica.

Myalgia of Tensor Fasciæ Latæ.—I should like to draw special attention to the monomyalgia of this muscle. It is often due to an injury usually of an indirect nature. The myalgic spots are generally found in the origin from the anterior superior spine and the border of its upper muscular part at the outer aspect of the thigh. Pain is referred to the outer aspect of legs and is greatly increased on standing, walking and bracing the injured leg. The results of procaine injections are marvellous and sometimes fantastic.

Myalgia of Kneecap.—It is a very common malady. Pain is referred to a circular or oval area round or below the patella or rarely to the popliteal space. The myalgic spots are localized in the border of the lower half of the semimembranous-tendinous and sometimes also in the lateral edge of lower part of the vastus lateralis. Myalgia of knee is present in many diseases

which are often diagnosed arthritis, osteo-arthritis, chronic synovitis, etc. In doubtful cases procaine injection may be used as a diagnostic test to prove conclusively that a given pain and disturbance of movements are of muscular origin. In addition one will find that the treatment leads to a rapid cure, provided objectively defined myalgic spots, but not just tender spots, said to be painful on pressure by patients, are thoroughly injected.

Painful Feet. Myalgia of Foot.—This condition is extremely important from the point of view of the Army. A relatively great number of men report sick because of the syndrome of painful feet. The complaints are of a dull ache or burning pain on the plantar or dorsal surface of the foot on standing and especially on marching. From a recent publication, R. T. Burkitt (1941), I cite the following sentences: "the condition of flat-foot in all its varying degrees is by far the commonest cause of doubtful efficiency. In the severe forms—the head of the tatus has gone right over—the flatness is complete. The majority have no troubles with their feet at all, they can perform long route marches. It is a recognized fact that the severest pain is always caused by the high arched foot beginning to give way . . . Any case which fails to respond to treatment (i.e. conservative M.G.) within three weeks should be 'boarded out' without delay." The author mentions the interesting fact that in his battalion thirty men reported sick with symptoms caused by fallen arches. But there were thirty-three other men in the same unit with a marked degree of flat-foot, as evidenced by foot-prints and appearance, who never complained although they had been for route marches. The results of thirty treated cases were: "seventeen probable failures out of twenty-six followed-up cases," i.e. 65.39 per cent failures.

From my own experiences in the Army I can confirm Burkitt's view: the same complaints of painful feet are mostly present in flat-feet, but also in men suffering from pes cavus. Moreover many officers and other ranks never complain of foot troubles in spite of fallen arches. From this fact one must, in my opinion, draw the conclusion that fallen arches—a very frequent anomaly—is neither the cause nor the origin of the syndrome of painful feet. In all the cases examined by me (about forty cases) an objectively definable disease—myalgia—of foot muscles could be ascertained. The myalgic spots are usually localized in the course or mostly in the insertion of tibialis anticus, the insertion of the Achilles tendon to the calcaneum and the plantar muscle in the middle of its course. Here, too, the injection of procaine into the accurately located myalgic spots serves as a diagnostic test, which proves conclusively that the pain complained of is of a referred nature and of muscular origin. It is found that procaine injection is a simple and reliable method which enables us to control pain permanently and restitute function in a short time indeed.

AGGRAVATION AND SIMULATION OF PAIN.

As students the habit was inculcated upon most of us that a patient's complaints are to be taken for granted. Actually this attitude of mind is

a fair and proper one for a doctor in civil life except in the relatively rare compensation cases. But under the present extraordinary conditions of a nation in arms, it has to be borne in mind that complaints may be exaggerated or even simulated because they may subconsciously—or in the case of a malingerer consciously—be intended to serve a special purpose. Although such cases are in my experience rare this point of view ought not to be lost sight of. Looked at from a psychological point of view, such a behaviour of a soldier or factory worker can be understood, although not approved of (*tout savoir, n'est pas tout pardonner*, under abnormal conditions). Psychologically it can be understood that a soldier or worker who has been doing a tricky, dirty or generally unpleasant job, dreams of a temporary break and of a peaceful rest in hospital. Small wonder that he may be subconsciously inclined to aggravate a slight or moderate pain, which he happens to feel, in order to excuse himself before his conscience for trying to shake off temporarily or for a longer period his duties towards his country.

The modern diagnosis of myalgia is based on objective criteria which, I think, enable us to distinguish with great probability or with certainty between a genuine complaint and exaggerated or simulated symptoms. The characteristic signs are: (1) delineation of pain: glove and stocking type of pain, or pain extending round a whole limb. (2) Pseudo-myalgic spots. If a pressure is exercised in an area of supposed referred pain, but not a myalgic spot, the patient gives a jerking of a part of his body. Moreover this reaction is *exaggerated*, e.g. the jerking is repeated several times and *delayed*, i.e. a few seconds elapse before the reaction occurs. During the time interval one distinctly feels a voluntary contraction of one or several muscles situated round the pressed upon area. In contrast to that the reaction of a genuine patient is immediate and consists of one jerk only. But a necessary precaution is to demonstrate to the patient the difference between a "sharp pain" elicited by pressure on a true myalgic spot and a pain produced by the same pressure on a normal muscle or bone. But I should like to emphasize that a diagnosis of simulated pain should be made only after several very thorough examinations have led to the same result; and in addition the patient should be given the benefit of the doubt.

STATISTICS.

The cases referred to in this article were seen by me partly at a Main Dressing Station and several Medical Inspection Rooms and partly at a rheumatism ward of a Military Hospital. The vast majority were treated very successfully by procaine injections, a few p.c. of the cases refused this treatment. Table I shows the distribution of myalgias over the different regions of the body, classified under the heading of rheumatic, traumatic and idiopathic. In the table all sciatic cases are included under myalgia of hip, the condition of painful feet under idiopathic myalgia of leg, unless a traumatic origin could be ascertained. It is interesting to note that myalgia

of leg was the most frequent malady, next in frequency were the myalgias of hip, dorsal + lumbar region and neck, diminishing in that order (Table I).

TABLE I.—STATISTICS (500 Cases).

<i>Myalgia of</i>	<i>Rheumatic</i>	<i>Traumatic</i>	<i>Idiopathic</i>	<i>Total</i>
	Number of Cases			
Neck	38	10	12	60
Shoulder	22	8	1	31
Arm	13	20	2	35
Dorsal and Lumbar	93	9	4	106
Hip	100	9	—	109
Leg	37	46	44	127
Chest	—	2	8	10
Abdomen	—	9	13	22
Totals	303	113	84	500

A very interesting fact emerging from Table II, which shows the frequency of individual muscle involvement, is: (1) *Quadratus lumborum* and *trapezius* are most frequently diseased, next in frequency being *tensor fasciæ latæ*, *glutei*, *semimembranous-tendinous* and *sacrospinalis* (*erector trunci*) in that order. (2) No myalgias were met with in the *triceps*, the *adductors* and *extensors* (except *lateral vastus*) of the leg. An explanation of the frequency of myalgias of the first seven muscles of Table II is suggested by distinguishing between two functions of a muscle. Bramwell has drawn attention to this distinction when dealing with primary muscular dystrophies. The author states that the distribution of muscular involvement in muscular dystrophies suggests that muscles which are of special importance as fixators in relation to maintenance of posture are predisposed whereas muscles more especially concerned with active purposive movements, of which we are more

TABLE II.—FREQUENCY OF INDIVIDUAL MUSCLES INVOLVED.

No.	Muscle	Number of cases	per cent
1	<i>Quadratus lumborum</i>	158	31·6
2	<i>Trapezius</i>	122	24·4
3	<i>Tensor fasciæ latæ</i>	84	16·8
4	<i>Gluteus medius</i>	70	14·0
5	<i>Gluteus maximus</i>	64	12·8
6	<i>Semimembranous-tendinous</i>	58	11·6
7	<i>Sacrospinalis</i>	55	11·0
8	<i>External cubital</i>	27	5·4
9	<i>Internal cubital</i>	25	5·0
10	<i>Rectus abdominis</i>	25	5·0
11	<i>Biceps humeri</i>	24	4·8
12	<i>Tibialis anticus</i>	24	4·8
13	<i>Peroneus brevis</i>	21	4·2
14	<i>Gastrocnemius</i>	20	4·0
15	<i>Vastus lateralis</i>	18	3·6
16	<i>Tendo Achillis</i>	14	2·8
17	<i>Pectoralis major</i>	12	2·4
18	<i>Peroneus longus</i>	8	1·6
19	<i>Deltoid</i>	6	1·2
20	<i>Abductor hallucis</i>	5	1·0
21	<i>Plantaris</i>	4	0·8
22	<i>Sternomastoid, brachioradialis</i> each	2	0·4
23	<i>Sartorius, gracilis, anconeus</i> each	1	0·2

directly conscious, are either spared or only affected at a later date. It would appear that this explanation holds good also for the relatively high incidence of involvement of quadratus lumborum, trapezius, sacrospinalis and tensor fasciæ latae which, to a large extent, are fixators. According to Bramwell the muscles of the thigh play an important part as fixators in running. Probably the semimembranous-tendinous plays a similar and equally important role as fixator of knee.

ÆTIOLOGY AND PATHOLOGY.

The primary cause or causes of rheumatic myalgias, as that of articular rheumatism, is not known. But in the opinion of most clinicians the following factors play a role as exciting causes. (1) septic foci, (2) allergic conditions. (3) climatic conditions, (4) endocrine dysfunction (thyroid, sex glands), (5) trauma and (6) mental worries and emotional strain. In my opinion, (7) "an autonomic imbalance" either in the form of predominance of the sympathetic—sympathicotonia—or of the parasympathetic—vagotonia—and probably also (8) an imbalance of electrolytes, especially of the Na:K:Ca ratio, may be important contributing factors. My experiences acquired in the Army have shown that in a great number of cases—22·6 per cent of all cases as shown in Table I—myalgias could with certainty be traced to a recent or previous injury. And what is more surprising is the fact that the myalgic spots—sole characteristic features of the disease—were commonly localized in the *same* muscular areas as in rheumatic cases. From these results it may be concluded that *trauma* might be *the* main or one of the main causes of non-articular rheumatism.

The pathology of myalgias is at present very obscure. Stockman (1920) has described the pathology of "nodules" which he took to be responsible for fibrositis. Stockman found the "nodules" to consist of inflamed white fibrous tissue and that the small blood-vessels often show very distinct thickening of all their coats, as if they had suffered from the action of an irritant. But it is necessary to point out that in the majority of myalgias "nodules" are conspicuous by their absence. In my experience a hard nodule is often found in the heads of the flexors of wrist and fingers in cubital myalgia. But in other cases the myalgic spots are harder to the touch than the surrounding area, i.e. the muscular area is in a spastic condition. This can best be seen in lumbago where the quadratus lumborum is contracted. In passing I should like to add that on appropriate injection of procaine the muscle relaxes almost instantaneously. Moreover nodules in the substance of a muscle are not rarely found in healthy subjects who have no complaints whatever. In my opinion the conclusion is justified that nodules are generally not responsible for myalgic conditions. In a recent publication (1942) Moynahan and Nicholson confirm that "nodules were not a constant feature of the malady clinically: they are absent more often than not." For this very reason, fibrositis is by no means an adequate term for the malady,

which is a muscular disease localized in anatomical parts of a muscle (Good, 1938). If an inflammatory condition were present, it should be termed interstitial myositis. But since the inflammatory process is very much in doubt, it would appear more appropriate to call it for the present myalgia or myopathy of rheumatic, traumatic or idiopathic origin. I should like to point out that an inflammatory process—myositis—appears to me to be an assumption which does not account for the facts as known to-day. It is a fact that injection of 1 to 2 c.c. of 1 per cent procaine abolishes the myalgic spot definitely and permanently. But it is extremely unlikely that a local anæsthetic will cure an inflammatory process in a muscle or any other organ without delay.

On the other hand the common denominator of the contributory factors of myalgia mentioned above may be looked for in a disturbance of the local blood supply. As a working hypothesis I have tentatively put forward the conception of a diminished blood supply, confined to the myalgic areas, leading to oxygen want—local hypoxæmia or hypoxia—which, it appears, will account for the characteristic symptoms of myalgias, viz. pain, paræsthesia and loss of power (Good, 1938). Such a "vasomotor disequilibrium" (Leriche, 1930) may be brought about by stimulation of vasoconstrictor sympathetic fibres. It is noteworthy that adrenaline, the action of which is often identical to stimulation of the sympathetic, has a dual effect on the blood-vessels of muscles, which are *dilated* by small doses and *constricted* by large ones (McDowell, 1938). Pemberton (1935) has put forward the same conception of disturbed circulation for articular rheumatism and brought forward evidence in support of this view.

TREATMENT.

A rapid, effective and permanent cure can be obtained by injections of procaine into the myalgic spots.

Solutions used:—

R. Procaine	...	...	...	1.0 grm.
phenol	...	...	...	0.5 grm.
saline ad	...	...	...	100.0 c.c.
S. sterile in rubber-capped bottle.				

Technique.—The myalgic spots are mapped out on the skin with a blue dermatograph, the pencil marks painted over with iodine and 1 to 2 c.c. of 1 per cent procaine solution injected into each spot, care being taken to infiltrate the whole myalgic area. The results of a thorough and an accurate injection are: (1) Almost instantaneous relief of pain; (2) relaxation of the spastic muscle as evidenced by palpation; and (3) pressure on the myalgic spot no longer elicits pain or produces a wincing involuntary jerking. In this way marvellous, sometimes fantastic, results are obtained, which must appear almost incredible to those who have not used the method or seen its

effects. Few things in clinical medicine can be more dramatic than to obtain, in a patient who is in agony and doubled up, an almost instantaneous relief of pain and restitution of the disturbed function of the diseased muscle after injection of procaine. But a proviso has to be added. These extremely favourable results will not be obtained by injection of "tender spots." It is to be noted that the spots are tender to pressure, i.e. the *patient* complains of pain on pressure. But it is evident that the diagnosis depends on a "subjective" sign only although most of the authors do not appear to have realized it. Moreover sensitiveness to pain differs very much individually as mentioned above. In this connexion, it is worth stressing that a myalgic spot objectively located and once properly injected no longer gives rise to complaints. A myalgia can be and often is cured by one treatment. If complete cure is not obtained, it is due to one of the following reasons: (1) Not all myalgic spots have been injected; (2) a faulty technique with regard to location of myalgic spots or injection or (3) aggravation of pain by patient.

Owing to lack of space I cannot discuss here the theory of the procaine effect, i.e. why a local anæsthetic should relieve *permanently* pain arising from a myalgic spot. The discussion of this question which is intimately connected with the theory of pain would require a special article.

RESULTS.

TABLE III.
ANALYSIS OF 230 CASES OF MYALGIA.

Treated 214		Not treated 15	Under treatment 1		Total 230
Reported 140		Not reported 74	Refused 13	Simulation. 2	
Cured 134	Not cured 6				

The analysis refers to cases I have seen in a place, somewhere in England, where I was posted for a longer period and was in a position to verify the results. Of the 230 officers and other ranks who suffered from myalgias fifteen received no treatment mostly because injections were refused; a few of these men were markedly improved after one to two injections but refused further treatment on the ground that in their opinion the injections did not do them any good. Two men were given no treatment, because I was satisfied that their complaints were not genuine.

Of the remaining 214 cases, who were treated by procaine injections only, 134 reported "cured," i.e. to have no complaints—pain or disturbance of function. Six men reported not cured, i.e. some had, although improved, still complaints, and a few were said to have derived no benefit from the treatment. All these cases were given a very thorough examination and I was satisfied that the complaints were aggravated. They were returned to

full duty and have not reported sick again in the next one to three months. Seventy-four cases have not reported after the last treatment, although ordered to do so. Neither have they reported sick later on. This applies to men belonging to units I was in charge of and to many cases referred to other medical officers of the ——— area to me for treatment. On inquiry the medical officers concerned confirmed that the men had not reported sick again. Taking an unprejudiced view it must, in my opinion, be assumed that the seventy-four not reported cases were cured or at least so much improved that the men did not think it worth while to report again. For completeness sake I mention that five men reported sick after one to two months with the same complaints but were cured by one to two more treatments. Among my cases were twenty-six of foot myalgia. The results of procaine injection were as follows: four men refused the treatment; of the twenty-two officers and other ranks treated thirteen reported cured and nine men did not report after the last treatment, although ordered to do so in two days.

In the light of the analysis just mentioned, it would appear that the results obtained are very good indeed. "Too good to be true" will probably be the opinion of many doctors who do not know the method and its results. I would not believe it possible myself but for the fact that the treatment has been given daily and the results could be verified easily. Many cases were demonstrated at medical officers' conferences at ———.

In conclusion, I should like to emphasize the point that according to statistics mentioned in an earlier paper (Good, 1938) the relative frequency of articular to non-articular rheumatism is 1:22.6 or 95 per cent of all cases of rheumatism are non-articular. Since myalgia is present in and responsible for non-articular rheumatism it is evident that the method described is applicable to round 95 per cent of patients suffering from rheumatic complaints. The experiences gained in the Army have proved that this method will stand the test of time and justify, I think, the conclusion that *rheumatism is for practical purposes a curable disease*.

SUMMARY.

Myalgia is a very frequent disease localized in certain anatomical parts of one or more muscles. Its characteristic features are "myalgic spots" which can be located by *objective* criteria and give rise to referred or heterotopic pain. Myalgia is present in and responsible for the vast majority—according to statistics 95 per cent—of patients suffering from rheumatism; it is not rarely associated with rheumatoid arthritis, osteo-arthritis and commonly with rheumatic fever. The malady is also responsible for a number of minor diseases which can be traced to an injury—traumatic myalgia. It is often of *unknown* origin—idiopathic myalgia—and mimics visceral and nervous diseases, heart pain, neuralgia, sciatica, syndrome of painful feet, etc. The *localization* of the myalgic spots—the characteristic features of myalgias—

of neck, shoulder, arm, back, lumbar region, hip and leg are described. Procaine injection into the accurately and objectively located myalgic areas is warmly recommended as relieving pain and other complaints in a most dramatic way and as leading to a rapid cure. Based on the experiences made in the Army I put forward the claim that *rheumatism is for practical purposes a curable disease.*

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EARLY ONE STAGE DRAINAGE OF LUNG ABSCESS.

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AMONG diseases of the chest in soldiers, and excluding conditions attributable to battle trauma, I have seen more cases of lung abscess than of empyema. The management of these lung abscess cases is of interest to the military surgeon. This paper refers only to the single abscess due to a primary infection or following the inhalation of septic material such as occasionally follows operation on the nose and throat. A considerable number of cases, loosely labelled as "pneumonitis," are in fact lung abscesses; the diagnosis of pneumonitis should be persisted in only if complete clinical and radiological resolution follows. A patient with a persistent radiological shadow of somewhat spherical outline who produces sputum should always be investigated as a possible lung abscess or carcinoma.

Example.—Guardsman J. B., aged 26, was admitted to a hospital (March 23, 1942) with cough, sputum and hæmoptysis. The physical signs were restricted to diminution of chest movements on the right side and the presence of a few moist rales over the anterior part of the right middle lobe. A radiograph showed an ill-defined, circular shadow in the area of the middle lobe. The temperature of a swinging type between 98° and 103° F. did not resolve under a full course of sulphathiazole but slowly settled after six weeks. Expectoration of $\frac{1}{2}$ to 2 ounces of non-smelling sputum continued; no tubercle bacilli were found after repeated examinations. After eighty days in hospital he was sent home on leave. He returned after eight days, ill, with slight hæmoptysis, a temperature of 102°, pulse of 110, and with considerable pain in the right mammary area. Friction sounds were audible in the right axilla and there was marked tenderness over the fourth right rib in the anterior axillary line. The white cell count was 19,000. A radiograph now showed an abscess cavity with a fluid level in the lateral bronchopulmonary segment of the middle lobe. A further course of sulphathiazole was given with no improvement in the general or local condition.

On July 18 the general condition was deteriorating and the abscess cavity was larger. I saw him on July 20 and operation was advised and carried out on July 23, four months after the first admission to hospital.

Operation (Local Anaesthesia).—Bronchoscopy localized the exit of pus from the right middle lobe bronchus: the lateral radiograph and the presence of a tender spot in the area mentioned above placed the abscess in the lateral segment of the middle lobe. Under local anaesthesia an overlying segment of rib $2\frac{1}{2}$ inches long was resected subperiosteally; the underlying pleura was thick and rigid; the cavity was needled and pus obtained; the abscess was then opened widely and explored with the finger and sucker. It was the size of an orange and had hard walls. It was packed and the skin was not sutured.

Progress.—The temperature settled at once and the general toxæmia

disappeared. The gauze was replaced by a tube on the eighth day and the wound was completely healed seven weeks after the operation when the patient was discharged to a convalescent hospital. Three months after operation he still had about 2 drachms of sputum a day and an area of cylindrical bronchiectasis around the old abscess area (delineated by lipiodol); he was placed in Category C. I do not think the ultimate prognosis is good because of the permanent bronchiectatic change. Such a result represents a reason advocated later in this paper for the earlier employment of surgical drainage to prevent the development of a rigid-walled abscess cavity.

In some 20 per cent of lung abscesses complete recovery from the acute condition follows expectant non-surgical treatment—such recovery is complete, dramatic and early. It is rare when expectoration is prolonged more than three to four weeks after onset of the disease.

Example.—Private H., aged 20, underwent dissection tonsillectomy on August 17, 1942. Progress was so satisfactory that he returned to light duties ten days later. Two days later, however, he felt cold and shivery and developed a cough with temperature of 102° F. and a pulse of 100. On admission to hospital (August 29) he complained of pain in the front of the right chest which was very tender to palpation over the anterior ends of the third and fourth ribs, where moist rales were audible. The radiograph showed a great increase in the markings of the interlobar fissure between the upper and middle lobes; in the anterior bronchopulmonary segment of the middle lobe a thin wall abscess cavity 1½ cm. in diameter was apparent. This segment is clearly best drained by the recumbent position since the middle lobe bronchus is almost anteroposterior in its direction and thus he was nursed. From the first day expectoration was copious and free; within a week the pain and temperature had gone and he was almost sputum free. A radiograph taken on September 17 (nineteen days after admission) confirmed the disappearance of the abscess cavity and only a faint opacity was present. He was discharged to convalescent hospital and three weeks later had made a complete symptomless recovery.

Such a happy result is known to all who have treated lung abscesses. These dramatic cures are so striking that the larger proportion of patients who die or develop chronic symptoms such as continued expectorations, often with hæmoptysis, the result of a chronic abscess or bronchiectasis, are apt to be forgotten.

A true picture has been well presented by American workers. A striking analysis of 2,114 cases collected by Allen and Blackman (1936) shows the deplorable results that follow the still widely accepted teaching that lung abscesses should only be operated on after a prolonged trial of medical treatment supplemented by measures such as postural drainage (which should always be employed in the early stages), bronchoscopic aspiration and phrenic evulsion. This period usually exceeded six weeks. Of these 2,114 cases, collected from many clinics, the mortality rate was 34·3 per cent. Freedlander (1936) reported a death rate of 40·3 per cent in a series of 236 cases. In addition he pointed out that of these 236 only 33·1 per cent could be classified as "Well" after treatment. British figures, for which there is no space in detail, often show a mortality rate of over 50 per cent partly

due, as Mr. N. R. Barrett has said, to the fact that the surgeon is often called "to apply the *coup de grâce*" to a moribund patient.

Figures quoted below show that these bad results are avoidable only by abandoning persistence in non-surgical treatment when the abscess is not progressing favourably to a cure. In the first case detailed above surgery should have been used when it was clear that progress was not being made, whereas in the second case surgical drainage would have been folly as improvement was rapid and sustained. Neuhof (1932), the first advocate of really early drainage, published his first paper on nine cases operated on well within six weeks of onset—eight recovered completely and one died. Writing later with Touroff (1940) he published 86 acute abscesses operated on with a mortality rate of 3·6 per cent but with the additional striking result that 88 per cent of the survivors were well and carrying on their normal lives.

THE REASONS PRESENTED BY OPPONENTS OF EARLY SURGICAL TREATMENT.

These are largely based on the unduly optimistic hope that lung abscesses will heal spontaneously—this is quite true in 15 to 20 per cent of cases; on the belief that these patients are far too ill to undergo surgery; that the results of surgery in the past have been bad; that the risks of producing an empyema and spread of the disease to other parts of the lung are considerable.

THE ANSWER OF THE EARLY INTERVENTIONISTS TO THESE OBJECTIONS

It is undeniable that spontaneous cure does follow non-surgical treatment as described in the second case-history of this paper; it is important to remember that this only happens early in the disease and that if spontaneous drainage has not led to a rapid and dramatic improvement in the condition after two or three weeks of postural drainage, etc., surgery should always be considered. The pathological reason for the low percentage of spontaneous cure lies partly in the fact that 70 to 80 per cent of these abscesses are located peripherally and do not usually open into a bronchus of a size sufficiently great to provide adequate drainage. Moreover if the inflammatory process does not resolve quickly the mucous membrane of this draining bronchus becomes cedematous and this swelling prevents the ready egress of the thick pus. This fact can be confirmed readily by the appearance as seen through the bronchoscope.

The belief that the patients are too ill to survive early operations is belied by the excellence of Neuhof's results described above: it is also necessary to remember that the grave condition of these patients is due to toxæmia resulting from the undrained abscess and that this toxæmia in the cases with foul smelling sputum is largely the result of a gangrenous process in the affected lung segment. The drainage of this massive area of sepsis is in many instances as imperative as the surgical attack on gas gangrene. If

the abscess has been accurately localized a small section of rib removed under local anæsthesia does not add a burden sufficiently severe to offset the benefits that follow the evacuation of the abscess especially as this can be done safely in one stage in many instances.

The objection that the results of surgery in the past have been bad is being answered by the fact that surgical treatment in the last few years has made great advances and that many past faults in the management of lung abscess have been acknowledged and are now largely avoided. The most important advance has been the insistence on the exact localization of the abscess followed by incision of the wall of the abscess at its most peripheral spot; the opening of a lung abscess through a mass of lung tissue is to be condemned thoroughly. Most lung abscesses are peripherally sited and at some early stage cause a localized pleurisy which usually produces a local tenderness of the overlying intercostal space. This site of local tenderness should be marked by a skin pencil as soon as it is detected as it tends to disappear later when the adhesion of the visceral and parietal pleura has become more firm. I believe the importance of this physical sign is not realized sufficiently. As evidence of the site of abscess it is confirmed or refuted by the localization provided by radiographs taken in the antero-posterior, lateral and/or oblique views. Bronchoscopy is often of the greatest value in demonstrating the site of the partially draining bronchus. It should be carried out under local anæsthesia.

After accurate localization the operative procedure should be straightforward; under local anæsthesia the overlying segment of rib is excised and if the parietal pleura beneath is thickened there is almost certainly adhesion to the visceral pleura. This adhesion should be verified by the most careful and deliberate incision of the parietal pleura: if the adhesion is firm the abscess cavity is explored with a needle and syringe and if the expected pus is found the abscess is opened, sucked out, thoroughly examined digitally and sloughing tissue carefully removed. The resultant cavity is lightly packed with saline gauze.

Example.—Corporal J. E., aged 39, was admitted on May 20, 1942, after five days of cough, pain in the right axilla and pyrexia of 100° to 101° F. He had had previous attacks of "bronchitis." He was dyspnoeic with many moist rales in the right lung and some dullness to percussion in the right axilla beneath the third and fourth ribs. A radiograph showed a roughly circular opacity in the lateral segment of the right middle lobe. On the next day there was blood mixed with the foul smelling sputum and the temperature ranged from 100° to 103° F. The general appearance was toxic. The white cell count was 13,000. There was a strictly localized area of tenderness over the fourth right rib in the anterior axillary line and this was carefully marked. A lipiodol bronchogram showed no bronchiectasis and no entrance of lipiodol into the opaque area. He was put on a full course of sulphathiazole but this had no effect and a week later the condition of the patient showed obvious deterioration and the sputum continued to be foetid and was 1 to 2 ounces daily. The white cell count was 20,000.

On May 25 a bronchoscopy under local anæsthesia revealed pus coming from the right middle lobe bronchus; an attempt at suction drainage produced very little pus nor did thorough use of postural drainage.

Operation.—June 2 (thirteen days after admission): A study of the radiographs confirmed that the tender area over the fourth rib corresponded with the opaque area which now showed an abscess cavity with a fluid level. Under local anæsthesia a portion of the fourth rib was resected subperiosteally and a thickened firm pleura was exposed: this was cautiously incised—there was no free pleural space. A needle revealed the presence of thick pus and an abscess cavity the size of a tangerine was opened into. Loose sloughs were removed and much foul pus evacuated. The cavity was loosely packed with saline gauze.

Progress.—This was extremely satisfactory, the sputum and hæmoptysis disappeared within a week, the gauze was replaced with a soft tube and the broncho-pulmonary fistula had healed within six weeks when he was discharged to a convalescent hospital.

The Advantage of One-stage Over Two-stage Drainage.—The time-honoured method of the two-stage operation whereby portions of one or two ribs were resected and an iodine-steeped gauze pack was placed over the parietal pleura with the object of creating an artificially made adhesion between the parietal and visceral pleura has the serious disadvantage that considerable post-operative pain, which limits thoracic expansion and checks the natural expectoration of sputum, has to be endured by an ill toxic patient whose morale is already low. A spread of the abscess was common and serious danger of the aspiration of pus into the hitherto unaffected lobes was encountered. A considerable proportion of these patients died before the second stage could be completed. That firm adhesion of the visceral pleura over the abscess to the parietal pleura takes place early is confirmed by operative experience.

Shaw (1942), who with Neuhof is a keen advocate of one-stage drainage, in his last forty-nine operations on early lung abscess found a partially free pleura in only seven instances; when he finds a free pleura he proceeds to shut off the abscess by direct suture: he then aspirates the air that has got into the pleural cavity and drains the abscess. My own preference when a free pleura is encountered is to rely on the old method of the iodine pack followed by drainage seven to ten days later.

SUMMARY.

(1) 15 to 20 per cent of lung abscesses cure themselves spontaneously with the assistance of expectant treatment and the intelligent use of postural drainage. An example of this is described.

(2) "Pneumonitis" is a dangerous diagnosis unless clinical and radiological evidence of complete resolution is obtained. If associated with continued expectoration and hæmoptysis the probable diagnosis of lung abscess or new growth must be entertained. If the condition of lung abscess is overlooked as the result of persistence in the diagnosis of "pneumonitis"

valuable time is lost and the acute condition becomes "chronic." Once a lung abscess has become chronic the prospect of complete cure by simple drainage is usually lost because of the development of bronchiectasis and other permanent mechanical changes. An example is given.

(3) The exact localization of the abscess to its appropriate broncho-pulmonary segment is essential: this is arrived at by the combined use of clinical signs, of which the most important is the early detection of an area of local chest tenderness, radiology and bronchoscopy.

(4) Unless the patient shows a rapid improvement under non-surgical treatment, operation at an early stage is indicated. This has been shown to lower the mortality rate and provide far better results than the old policy of *laissez-faire*.

(5) Most lung abscesses are peripherally located and early pleural adhesion is the rule.

(6) The advantages of the one-stage over the two-stage drainage method are considerable. An example of early drainage is presented.

The nomenclature of the broncho-pulmonary segments adopted is that described by Foster-Carter 1940.

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CONTINUOUS INTRAVENOUS ANÆSTHESIA WITH SODIUM PENTOTHAL AT A MILITARY HOSPITAL IN THE MIDDLE EAST.

BY CAPTAIN A. W. RAFFAN, M.B., CH.B.

Royal Army Medical Corps.

THE shortage of nitrous oxide gas in the Middle East has stimulated research into the use of sodium pentothal for prolonged anæsthesia. The observations in this paper are based on a series of 200 cases in which anæsthesia lasting from 20 to 230 minutes was maintained. About 40 per cent of these cases were battle casualties.

Method of Administration.—Several methods were tried. The simplest was found to be the most convenient. The apparatus finally adopted con-

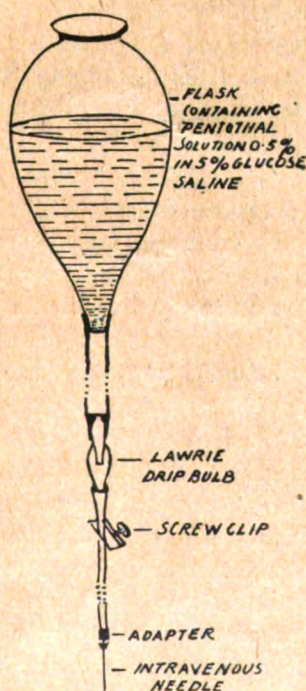


FIG. 1.—Diagram of the apparatus.

sisted of a funnel-shaped flask as used for blood transfusion in the Middle East, a Lawrie drip bulb, a screw clip, an adapter to fit the needle used, and appropriate lengths of tubing (see fig. 1). A fairly wide bore needle was used since infusion of the dilute pentothal solution was by gravity only; a narrow bore needle requires a positive pressure apparatus.

After various strengths of pentothal had been tried, it was found that a level plane of anæsthesia was best maintained with a 0.5 per cent solution of pentothal, provided that induction was made by a few cubic centimetres

of a 5.0 per cent solution. The 0.5 per cent solution was made up in glucose saline (1 gramme pentothal to 200 c.c. of 5 per cent glucose-saline).

The actual technique of administration was as follows:—

The apparatus is filled with the 0.5 per cent pentothal solution, the flask being hung on a stand three feet above the patient; air having been expelled from the lower tubing, the screw clip is closed. The needle is inserted into a suitable vein, usually in the arm, and the apparatus then connected via the adapter. The drip is then started at about 120 drops per minute and the needle and tubing are fixed to the arm with adhesive tape. The rubber tube near the adapter is now pierced with a fine needle attached to a 10 c.c. syringe into which a 5 per cent solution of pentothal has already been drawn, and 5 to 6 c.c. of this 5 per cent solution are injected; this makes for a rapid induction after which the fine needle is withdrawn. The syringe containing the 5 per cent solution should be kept handy in case it is necessary to deepen the plane of anæsthesia quickly.

Signs of Anæsthesia.—The depth of respiration is the best guide to the depth of anæsthesia. Pentothal depresses the respiratory centre and a constant watch must therefore be kept on the respiration. It is necessary to have oxygen and carbon dioxide at hand, attached to some form of apparatus capable of distending the lungs. Under pentothal anæsthesia both systolic and diastolic blood-pressures fall, the degree of the fall varying with the individual. The respiratory rate remains remarkably constant throughout a prolonged operation, as does the pulse rate. The appearance of cyanosis, provided that it is not due to a mechanical obstruction of the airway (which should be excluded by insertion of an artificial airway), is an indication of very deep anæsthesia and should be avoided. The pupils gradually become smaller as the operation progresses but not until they are minute do they cease to react to light; they have been found to react to light after seventy minutes' anæsthesia.

Premedication.—Morphia $\frac{1}{4}$ grain and atropine 1/100 grain are given half an hour before operation. Without morphia the dosage of pentothal is necessarily increased; in fact induction is apparently slower although the patient sinks quite suddenly into a very deep plane of anæsthesia. Atropine is given to abolish secretion in the respiratory tree. The cough reflex is very difficult to abolish under pentothal anæsthesia and the least secretion is inclined to cause troublesome spasmodic coughing. Atropine seems to diminish this tendency.

Post-operative Complications.—These are few and of little importance. In fact, the absence of post-operative complications is one of the great advantages and only nitrous oxide among the available anæsthetics in general use can compare with pentothal in this respect.

Complications encountered among the 200 cases under review have been—slight cough 4 per cent of cases; nausea 12 per cent of cases; actual vomiting 8 per cent of cases; moderate headache 6 per cent of cases; none of which persisted for more than twenty-four hours.

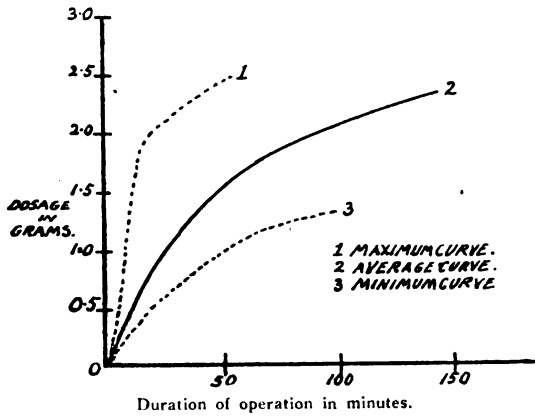


FIG. 2.—General surgical procedures (including orthopædic, ear, nose, throat and ophthalmic surgery).

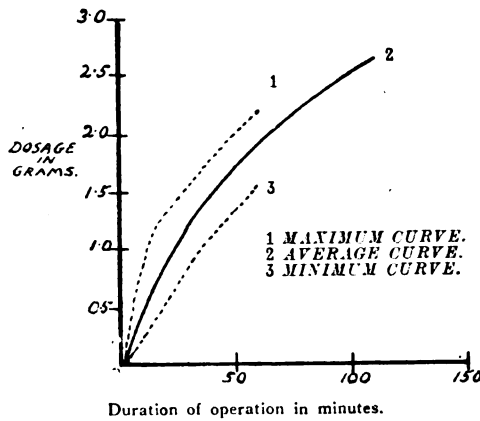


FIG. 3.—Surgery of the skin.

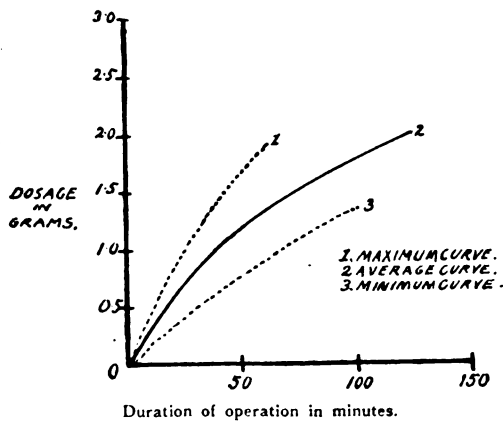


FIG. 4.—Brain Surgery.

Dosage.—The dosage of pentothal, naturally, varies with the individual, the surgical procedure and the duration of anæsthesia required. But broadly speaking, after induction, the amount of pentothal required to maintain anæsthesia becomes less as time goes on. Thus, while one gramme may be needed for an operation lasting twenty minutes, three grammes may be sufficient for an operation lasting three hours.

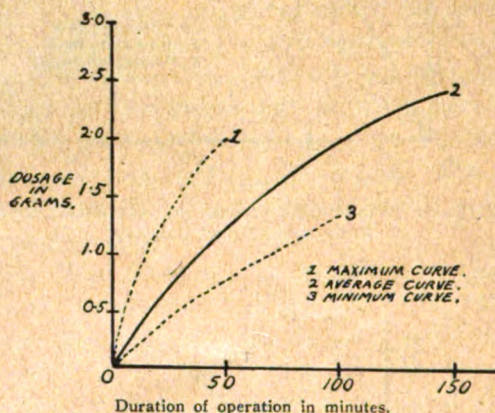


FIG. 5.—Surgery of cases handicapped by shock. Cyanosis, toxæmia or anæmia.

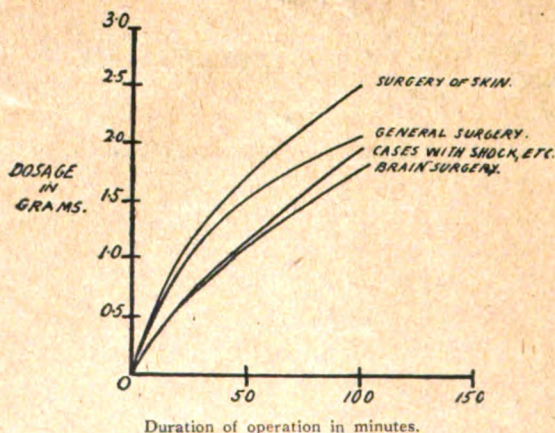


FIG. 6.—Average curves superimposed.

Though induction with pentothal is rapid, there is a definite time interval of about five minutes between the loss of consciousness and onset of complete anæsthesia and it is advisable to wait for this interval before beginning the operation. Even then the patient may stir as the first incision is made.

The 200 cases under review here have been divided into four groups according to the type of operation done and graphs have been made to show the dosage of pentothal required for each group. In general, operations involving chiefly the skin (e.g. skin grafting, circumcision, etc.) require

more pentothal per unit of the time than do procedures involving the deeper structures (e.g. inguinal herniotomy, mastoidectomy, etc.). Cases of operation on the brain need relatively small dosage as do cases handicapped by anæmia, shock or toxæmia.

The four groups of cases for which graphs of dosage have been prepared are:—

(1) General surgical procedures, excluding groups (2), (3), and (4) (e.g. herniotomy, orthopædic, ear and ophthalmological cases) (*see* fig. 2).

(2) Operations involving chiefly the skin (e.g. skin grafting, circumcision) (fig. 3).

(3) Brain operations (fig. 4).

(4) Surgery of cases suffering from anæmia, shock, or toxæmia (fig. 5).

Fig. 6 shows the average curves of the above four groups superimposed. Thus:—

(1) In a routine operation, inguinal herniotomy for example, lasting thirty minutes in a fit male, one would use from 0.7 to 1.4 gramme with an average of 1.15 gramme.

(2) In a skin operation lasting thirty minutes, one would use from 0.9 to 1.6 gramme with an average of 1.25 gramme.

(3) In a brain operation lasting thirty minutes, one would use from 0.5 to 1.15 gramme, with an average of 0.8 gramme.

(4) In a case handicapped by anæmia, shock or toxæmia, lasting thirty minutes, one would expect a variation between 0.5 and 1.5 gramme, with an average of 0.8 gramme.

CONCLUSION AND SUMMARY.

The advantages of continuous pentothal anæsthesia were found to be:—

(1) Ease of administration and avoidance of delays, due to induction, between operations.

(2) Induction pleasant and rapid, particularly desirable where patient was obviously going to have several operations.

(3) Small incidence of post-anæsthetic complications.

(4) Reduction of intra-ocular pressure; a great convenience in some ophthalmic operations.

The disadvantages of the method were:—

(1) Difficulty of maintaining a good airway where access to the head was difficult. Definitely contra-indicated where blood from the wound was likely to seep into the respiratory passages.

(2) Poor muscular relaxation.

(3) The danger of administration by an inexperienced anæsthetist in cases suffering from shock.

I have to thank Lieutenant-Colonel G. A. H. Buttle, R.A.M.C., for his help with the apparatus, Major R. W. Cope, R.A.M.C., for his advice and criticism, and Major R. S. Handley, R.A.M.C., for his help in compiling this paper.

ARMY SISTERS.¹

By J. L. HODSON.

"Conspicuous in this march past was a group of British Army nurses."—*News Chronicle* on Mr. Churchill at Tripoli.

ON whether performing Christ-like work gives added physical courage and spiritual strength, opinions may vary. But I remember thinking during the last war that I had never seen a doctor or stretcher-bearer with the "wind up"; and such medical services as I have come across during the past two or three years—including Tobruk and Rangoon—were as calm and engrossed as though in a London hospital. It is unlikely the exact facts will ever be known as to how many doctors and Sisters have given their lives or are wounded or prisoners of war through refusing to leave their patients, but it is certain that ten Army Sisters are prisoners of war taken in Hong Kong and that a number are missing from Malaya.

Through records of our Army Sisters' experiences in this war, some of which I have been privileged to read, bravery and selflessness shine like stars. It would be possible to write a history of the war as seen through the Sisters' eyes, for they have been almost everywhere—Belgium and France, Dunkirk, Singapore, Rangoon, India, Middle East, North Africa; they have been shelled, bombed, dive-bombed, and sunk at sea; they have lived in open boats and slept in fields guarded by armed men. They have worked in a hospital at Singapore that was between two fires, our heavy guns behind them and the Japanese shells from in front whining over their heads; they were on a ship in Dunkirk's inner harbour when two piers were broken and a third blazing and the prospect of rescuing anybody further seemed too remote (yet the ship took off 600); they have waited in Greece for the Germans to capture them when each day the enemy drew nearer and German wounded they were looking after promised them visits to Vienna or Berlin if only they would stay. They have tended Italian prisoners of war when it was necessary to take sips of the medicines first to convince the Italians that we were not deliberately poisoning them (so effective had enemy propaganda been). On one occasion a number of Greeks arriving wounded from Albania were so filthy and vermin-ridden that they had to be shaved from head to foot.

They have toiled along the roads of France among refugees, delivering women of babies in unpromising circumstances; they have been in bombed hospital-trains and had the duty of preventing the shell-shocked from throw-

¹ Reprinted by kind permission from *The Spectator*, February 12, 1943

ing themselves out of the carriage windows. The "Q.A.'s," as they call themselves, have certainly been in the thick of it from Iceland to the South Seas. Often they have worked fourteen and sixteen hours a day—and sometimes far more. Biting cold and great heat have been encountered, but one finds a note—"We seem to manage to nurse all the same, and soon after arrival were functioning as if we had been here for years." One reads of Sisters struggling on when suffering from sandfly-fever, and, on the lighter side, how plagues of ants and of cockroaches that ate all the gum from the labels, envelopes and stamps and devoured silk underwear, added to the day's problems. There were the patients who spoke no English—Greeks or Indians or Italians or natives—and there was the occasion when wounded prisoners wrapped themselves in blankets with pyjamas round their heads as headdress; on being remonstrated with they pointed out that some head-dress was essential, so turbans were made from towels till something more appropriate could be found. One forgets how unpleasant Nature can be in the Middle East, but there is the reminder of winds that can raze buildings to the ground, and of sand that can seep into everything till sheets and blankets are not to be distinguished from one another. Personal movements are difficult enough in a black-out, but imagine loading stretcher-cases on to a ship by the light of torches; and there's the remark—"During our sixteen days at Changi, storm-lanterns and torches were not allowed and, had it not been for the moon's reflection, I do not know how any of us would have managed after 7 p.m."

This note—of ability and determination to continue, whatever the difficulties are—is struck time and time again. On Kebab island, a party of them were marooned for three days without food of any kind, only about a gallon of fresh water, and no dressings for wounded except torn-up pieces of clothing. And again (when a troopship was sunk)—"We did some first aid, but we hadn't many dressings so we used our caps—just tore them up to tie on wood for splints"; and this further example (a convoy from the 51st Highland Division had come in from the Maginot Line)—"Then work was all that mattered—no one even thought of off-duty. Electricity went off, gas cut (they had had much bombing), big dressings done by Primus, the theatre going regardless of Jerry's day and night raids. He took a fancy to call every two hours when we got the ambulance loaded with serious cases for the base. . . ." When a vessel carrying some of them from Singapore was bombed by 57 aircraft, seven direct hits were received . . . "several times the ship pitched over to one side, but managed to right herself and plod steadily on. After each lurch it was sweet music to hear the throb of the engines. We were busy attending to the wounded and improvised three small sick-rooms—they lay on mattresses on the floor." In lighter vein is a note from India: "In the middle of the operation, it became very dark and a dust-storm arose. Suddenly, with a fearful noise, a pigeon arrived down the

chimney covered with soot and dust, flew round the theatre twice and then settled on the screen, where it remained cooing softly to itself for the remainder of the operation."

The truth about war is not easily achieved or set down while the war is on, but these Sisters' notes have a beautiful candour and honesty. Twice it is recorded that, on hospital trains in France, the drivers would not proceed farther until armed guards were placed on the engines; of passengers on a ship from Gibraltar a Sister mentions that although they were being taken home at no expense to themselves and in comfort, they did nothing but grumble, each trying to seize the best places, and they appeared to think the Sisters were "universal aunts," with free stocks of everything. There are revealing notes on how calm human beings can be when the end is thought to be near. When a troopship was sunk—"There was no panic—people spoke very quietly and seemed dazed"; again, when the hospital-carrier "Paris" was bombed a few miles from Dunkirk, a Sister had gone down to her cabin to prepare herself for duty when a terrific crash threw her to the other end of the cabin. Lights fused and everything became dark. "It was terrifying; I thought it was the end, but, strangely enough, I seemed perfectly calm and managed to pick up my grey print cape from the table. Clutching this, I groped my way into the corridor . . . it was extraordinary how calm, cool and collected I felt . . ." In passing, those who may have doubted whether the Germans have deliberately attacked hospital ships would have their minds resolved by these Sisters' records. On the "Isle of Guernsey" cannon shells went through the mast at bridge height and (notes a Sister) the five large red crosses must have been clearly seen. Again, at Dieppe, hospital-carriers were set on fire and flames spread to an ambulance train near-by. Several times hospital trains were machine-gunned. The Japanese were no better. At Singapore—"In spite of large red crosses on all the buildings and barrack square, the Japs dive-bombed and machine-gunned us frequently . . . it was terrible to see the shell-shocked patients and hear their screams as the bullets fell round us."

It was at Singapore that a group of Sisters waited to be handed over to the Japs—it is written of laconically: "but our troops pushed them back four miles and gave us another chance to escape"; similarly, a Matron: "personally, I was far too busy to worry about the future, and accepted it all quite calmly." They faced this contingency as they confronted the rest; but they seize on the lighter side of war when they can—as a group did who, during the débâcle of France, gathered baskets of wild strawberries and swam daily in the Seine.

To say that the spirit of Florence Nightingale lives in these women is trite; yet I do not know how better to express one's opinion. There is this difference: Florence Nightingale had to force herself on the Army; by indomitable will and social influence she muscled into the Crimea. Our Army

Sisters to-day are an integral part of the force, never far from the fighting. Every Sister ranks as a lieutenant and wears similar badges; senior Sisters are captains, Matrons majors, the Matron-in-Chief a brigadier. Slowly they have won the status they deserve, and need. (Seldom does the right thing get done without a fight.) It has taken time to win recognition of the fact that a qualified nurse is as much a professional person as a doctor. Whether the Sisters' pay is adequate is another matter; I much doubt it. Were it not for their colonial allowance when overseas, they could hardly rub along. But neither inadequate pay nor anything else will prevent women from doing this magnificent work.



Editorial.

SURGERY IN THE DESERT.

IN 1931 when a small party of officers and men from the British Garrison in Cairo managed to cross the Desert with motor vehicles and reached the historic oasis of Siwa, eventually returning to Cairo without loss of men or material, the undertaking was hailed, particularly by the Army authorities in Egypt, as a not inconsiderable achievement. Men who knew the Desert appreciated the difficulties. It would be safe to say that it gave the General Staff cause for thought in that the Libyan Desert—the western barrier to Egypt, previously regarded as an impassable barrier to an army—had been proved to be capable of negotiation.

Roughly ten years later a force of British and Colonial troops, barely two divisions strong, chased the enemy out of Egypt and followed him into his own territory even as far as Benghazi. By then we had become so accustomed to hearing about Desert warfare and its peculiar problems that we began to take things for granted, without stopping to remind ourselves of the enormous amount of organization and planning that had been necessary to bring about such an amazing change; a change characterized not so much by the fact that we had actually ejected from Egypt an enemy considerably superior in numbers and had captured many of his men and much of his equipment, but because it demonstrated that even a modern army can manœuvre and contain itself in such an abomination of desolation as the North African Desert.

By now all officers in the Corps know what changes had to be made in arrangements to meet the medical needs of this Desert warfare, in which opposing forces move rapidly and manœuvre like fleets at sea. The Corps is proud of these achievements and appreciative of the fact that they have been acknowledged in the Honour conferred on the Director of Medical Services, M.E.F.

We know, too, by this time what were the changes necessary to make the "Surgical Service" in the Middle East Force capable of taking its proper place in the medical organization. We also know that the Hartgill Committee at the W.O. made much use of the reports received from the experienced "Desert Rats" in the M.E., as well as that from less active fronts, in planning and devising our latest field medical units and organization. The new Field Surgical Units, based on those hastily scraped together in the M.E. are already proving their worth in North Africa.

Outstanding changes in surgical policy and outlook in relation to the treatment of various types of wounds have already been broadcast through the medium of A.M.D. Bulletins, War Office Memoranda, etc. It is neces-

sary to remain alert and to react to any new situation with the least possible delay. At all times we must be prepared to abandon any method which has not stood up to the test of practical application in any particular theatre of war, or to accept fresh developments which, after due appraisal, seem likely to be of general value.

It is obvious that although we have improved our surgical work in a large number of ways, there are still pitfalls to be avoided. For instance pressure sores round the ankles or dorsum of the foot, where a temporary clove-hitch extension for a fracture has been left *in situ* beyond the A.D.S. Adhesive extension strapping is provided at every A.D.S. Again, limbs continue to arrive at Base or L. of C. units encased in plaster of Paris or tightly bandaged and with the circulation embarrassed. Medical officers tend to forget how inevitable in a wounded limb is the onset of post-traumatic oedema. Unless an encased limb can be kept under personal observation for forty-eight hours the cast should always be split before the patient is evacuated.

In spite of repeated warnings the optimism of some surgeons still induces them to attempt primary suture and then to pass the case on to someone else. There is ample evidence that immediate (primary) suture is not justified in spite of local sulphonamide or oral administration unless the surgeon is able to retain the case under his own personal supervision and is prepared to treat the consequences! Delayed primary suture may be justified, but this again should be a matter for decision only after careful consideration and personal observation of the case. Failure of immediate or delayed suture will prolong convalescence, even if it does nothing worse. A skilful and experienced surgeon in a well-appointed operating theatre may manage to virtually sterilize a relatively fresh wound, using a scalpel alone, but under conditions in the Desert that is wellnigh impossible and it is wrong to assume that the local application of sulphonamide can make up for imperfections in the surgical procedure. It is known that sulphonamide alone will not prevent the growth of wound contaminants and that it has virtually no action on the dread anaerobes. Bacteriologists think that it has not materially changed the flora of wounds since last war; on the other hand, experienced clinical observers appear to think that it has certainly altered wound intoxication and both agree that the establishment of infection has been reduced in wounds of certain localities (head, chest and abdomen). By some, the tie-on "Sulphonamide Label" originally suggested by Logie, Mitchell and Buttle, recently simplified by Boyd, is regarded as an outstanding advance in that it renders dosage almost fool proof.

It has been found necessary to issue a warning against excessive local application of sulphanilamide powder to extensive third degree burns, because serious toxic effects have been reported. On the recommendation of the M.R.C. War Wounds Committee field trials with a mixture of Sulphathiazole and Proflavine, in powder form, are to take place. "S.P. Powder" (99 parts Sulphathiazole and 1 part Proflavine) can be used both

in prophylaxis and treatment of wound infection in the same way as sulphonamide is now used. The limitations imposed by Desert conditions has led to a modification in the treatment of infected wounds. Those over twelve to twenty-four hours old have been treated in the Middle East by a limited operation described as "wound trimming." In effect, this simply means the removal of foreign matter and dead tissues and the relief of tension by incisions planned to facilitate drainage.

Surgeons at the Base complain that medical officers in the forward areas are still prone to forget how important it is to write brief and legible notes on Field Medical Cards. The whole course of the case may depend on the accuracy of the information so conveyed. Lives and limbs have been saved by an underlined note made by a Field Ambulance M.O. directing attention to some complication which may be anticipated and should be guarded against.

It is good to be able to report that the figures for recovery of abdominal wounds from the El Alamein battle, when these become available, may be expected to show a recovery rate which is a considerable improvement on any previously reported results. The Consultant Surgeon, Middle East Force, considers that this improvement may be attributed to the following:

Excellent resuscitation arrangements and good selection of cases. Early operation to control hæmorrhage and to suture damaged hollow viscera. The performance of temporary colostomy either (a) above a damaged or sutured loop of large gut, or (b) by exteriorization of the damaged segment or segments. Sulphadiazine, introduced in the peritoneal cavity in neighbourhood of injury before closure. The immediate establishment of suction drainage of the stomach. Nothing by mouth. Intravenous fluid drip continued for several days. Holding the cases in F.D.S.s or C.C.S.s until fit to travel.

Closure of sucking chest wounds by suture temporarily allays the distress of an open pneumothorax, but unless it is preceded by a complete wound excision it will suffer the fate of all sutured war wounds; two days later it will be heavily infected, the sutures must be removed, the sucking wound is re-established, now complicated by a pyo-pneumothorax and a cellulitis of the chest wall. It is now advised that sucking wounds (after trimming, if the patient's condition allows it) should be closed by a sterile pad, folded to fit the hole and held in position by a few silkworm gut sutures tied over it. This method is safe and mechanically satisfactory and the opening will either close spontaneously under a series of pads, or can be repaired by secondary suture in a Chest Centre when the primary reaction to injury is past.

Face wounds, too, are harmed rather than helped by early surgery. Excision will not avert infection, and suture—even loose approximation—besides inviting cellulitis leaves ugly stitch scars. These injuries, after first-aid fixation of jaw fragments by the dental officer and surgeon, should be dusted with sulphanilamide powder, covered with vaseline dressing and left widely open.

Head injuries travel well and the tendency is to do as little conservative surgery as possible in the forward areas and transfer the case as soon as possible to a Centre.

Administrative medical officers have ceased to regard the posting of a surgeon to a particular location as constituting an adequate or complete solution to the local surgical requirements. A surgeon cannot perform his proper function unless he can work with his own team at a properly constituted Surgical Centre, where his worst cases can be resuscitated before they come to the theatre and nursed after operation. The selection of cases, both in relation to the necessity for, and priority of, operation is best left to the Resuscitation Officer, in consultation with an officer of surgical experience. The development of the Resuscitation Service is one of the outstanding features of this war. What appears to be required now is a little more judgment as to when plasma and fluids will suffice and when whole blood is required; alternatively, when whole blood is not necessary. There has been a tendency to date to use this life-giving fluid too liberally or even wastefully. The provision of even the minimum essential fresh whole blood for a force is a major problem.

Such, then, are some of the useful lessons we have learnt from this Desert surgery. Treatment carried out by keen and tough young men under circumstances, which, even under optimum Desert conditions, would be regarded by the average experienced surgeon as extremely difficult. At times, indeed, climate, dust storms, shortage of water and black-out have made such conditions appalling. Some of the surgeons have even worked through a period of temporary captivity—few have not worked under fire. Their zeal and the knowledge that they were doing a fine and really worth while job has sustained them. Their reward, the recovery of many men who would have succumbed but for their efforts and the admiration and thanks of those whose pleasure it has been to direct and assist them.

Clinical and other Notes.

A SHAKER FOR USE IN THE KAHN TEST.

BY LIEUTENANT-COLONEL J. W. BIGGER, M.D., Sc.D.

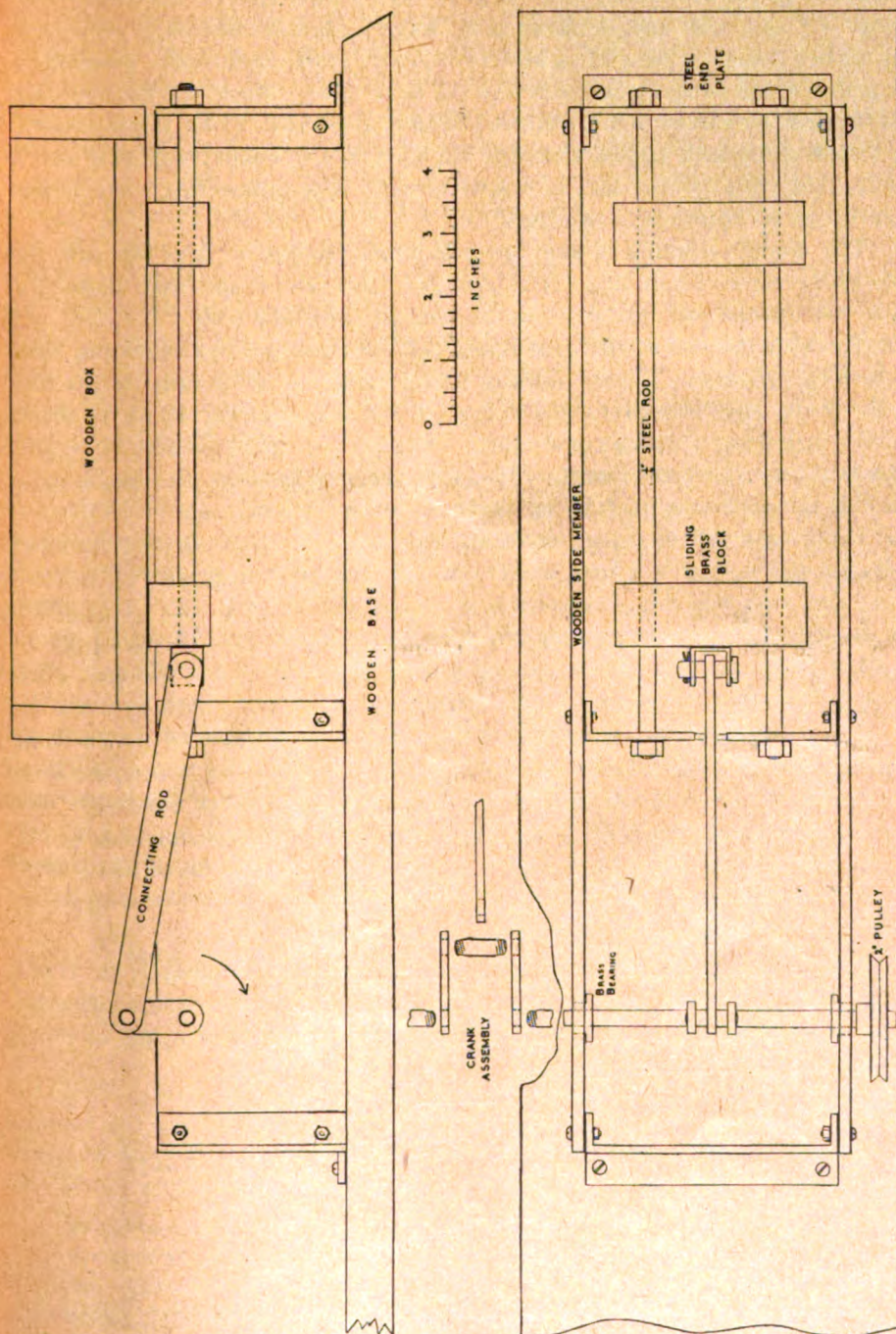
Royal Army Medical Corps.

THIS shaker was designed and constructed because no mechanical shaker was available in the laboratory in which the writer works and because it was found almost impossible to shake a rack of Kahn tubes at the recommended rate by hand. Despite its simple and inexpensive construction it has worked satisfactorily for more than a year with the minimum of attention. It is described in order to enable others who perform Kahn tests and have no mechanical shakers to have similar machines made. The design may be modified to enable racks of other types or several racks at the same time to be shaken.

The apparatus is built on a strong base board of 1 inch oak measuring $26\frac{1}{2}$ by 6 inches. Firmly attached to this, towards one end, are two side pieces of $5/16$ inch oak, 17 by 3 inches. These sides are kept 4 inches apart by three steel plates (4 by 3 inches), one at either end and the third intermediately. The steel plates have $\frac{1}{2}$ inch flanges to which the oak side members are bolted: they have also similar flanges which are screwed to the base board. The middle steel plate has a slot $1\frac{1}{2}$ inches deep and $\frac{1}{2}$ inch wide in its upper edge to allow a connecting strip to pass through. Two $\frac{1}{4}$ inch holes are drilled 2 inches apart and $2\frac{1}{2}$ inches above the base board through the middle plate and one of the end plates. Through these holes pass the ends of two $\frac{1}{4}$ inch steel rods, each $10\frac{1}{2}$ inches long. The ends of these rods are threaded for $\frac{1}{4}$ inch so that they may be firmly attached to the supporting plates by nuts.

A lidless box is used to hold a rack of tubes. It is strongly constructed of $\frac{1}{2}$ inch oak with mortised joints. In this model, the box measures $8\frac{9}{10}$ by $3\frac{1}{4}$ by $1\frac{3}{4}$ inches internally so as to hold firmly the copper rack of a Hearnson's Wassermann water bath. Two transverse oak (or, preferably, brass as is shown in the diagram) blocks, 3 inches long and 1 by 1 inch in section, are firmly bolted to the bottom of the box. These blocks are situated 5 inches apart and $1\frac{1}{2}$ inches from the ends of the box. Two $\frac{1}{4}$ inch holes, 2 inches apart, are accurately drilled through the blocks so as to lie in the long axis of the box. These enable the box to slide on the steel rods fixed longitudinally beneath.

The crank assembly is of simple construction. Two $\frac{1}{4}$ inch steel rods are screwed into the ends of the crank arms. The opposite ends of the crank arms are joined by a short piece of $\frac{1}{4}$ inch steel rod, screwed in a similar



manner. The crank arms, which are made from $\frac{1}{2}$ by $\frac{1}{8}$ inch steel strips, measure $1\frac{1}{2}$ inches overall and the holes are 1 inch apart. The connecting strip of $\frac{1}{2}$ by $\frac{1}{8}$ inch steel, 6 inches long, has $\frac{1}{4}$ inch holes drilled at either end, $5\frac{1}{2}$ inches apart. One end is attached to the crank before the assembly is completed; the other is connected to the near sliding block, on the underside of the box, by means of a U-plate screwed to the block. This U-plate carries a $\frac{1}{4}$ inch pin which passes through the hole in the connecting strip and is prevented from falling out by a split cotter. The connecting strip is kept central on its bearings by washers.

The crank assembly is supported in brass bushes let into the oak side pieces $2\frac{1}{2}$ inches from their ends and $2\frac{1}{2}$ inches above the base board. A 2-inch boxwood pulley is fixed to one end of the crank axle.

Towards the end of the base board remote from the box is an oak block 5 by 5 by $3\frac{1}{4}$ inches. To the sides of the block which are parallel to the long axis of the base board are screwed steel plates measuring $4\frac{1}{2}$ by $1\frac{1}{2}$ inches with $\frac{1}{2}$ inch flanges which are slotted. Through the slots pass screws holding the block to the base board. This arrangement permits the block to be moved longitudinally to take up slackness of the driving belt. The block is drilled transversely $3\frac{1}{2}$ inches above the base board to take a brass tube which acts as bearing for a $\frac{3}{8}$ inch steel rod. To the projecting end of this rod a $5\frac{1}{4}$ -inch box wood pulley with a cranking handle is fitted. This pulley is aligned with the 2-inch pulley attached to the crank axle. A round section leather belt transmits power from the large pulley to the small one. This part of the apparatus is not shown in the diagram.

A rack of Kahn tubes is fitted in the box and, by means of the cranking handle, the large pulley is rotated exactly 100 times a minute for three minutes. In practice, it is best to aim at 25 revolutions every quarter minute. This oscillates the rack 280 times a minute with an excursion of 2 inches. With this shaker a rack is shaken at the correct rate with much less fatigue than when the rack is shaken by hand, but, if desired, an electric motor may be fitted.

I have pleasure in expressing my indebtedness to Captain J. B. Hurll, R.A.M.C., who was largely responsible for the design of the shaker and who drew the diagrams, and to the officers and men of a company of R.E.s who made the machine.

THE TOXIC EFFECTS OF LOCAL ANALGESICS. THEIR PROPHYLAXIS AND TREATMENT.

By MAJOR A. KERR-BOYLE, M.D., D.A.

Royal Army Medical Corps.

Local analgesics are protoplasmic poisons with a selective affinity for nerve tissue. The toxicity of a particular local analgesic may be actually

high but relatively low, since it may retain its efficiency in high dilution. It is its relative toxicity which determines the safety of an active substance; its absolute toxicity is of little importance. The relative disproportion between therapeutic and toxic doses is the measure of relative toxicity which bears an inverse proportion to the relative efficiency of the drug. The higher the therapeutic coefficient, given by the ratio, minimal lethal dose/minimal analgesic dose (M.L.D./M.A.D.), the higher is the relative efficiency and, therefore, the safety index. The absolute toxicity of percaine is greater than that of cocaine and of procaine. For equivalent degrees of surface analgesia, however, cocaine is twenty-five times as toxic as percaine, while in the concentrations necessary for equal degrees of infiltration or regional analgesia cocaine has five times the toxicity of procaine and procaine almost twice that of percaine. The toxic effects which may be associated with the use of local analgesics will be discussed under the following headings: (1) Immediate; (2) remote.

(1) Immediate toxic effects, occurring during the injection of the analgesic solution or shortly thereafter, may result from: (a) Administration of an excessive amount of solution—gross overdosage; (b) inadvertent injection of the solution into a vein; (c) idiosyncrasy to drugs of the local analgesic group.

(a) *Overdosage*.—Cocaine is the most toxic of all the local analgesics. The administration of an overdose is easy even when it is simply applied to a mucous surface. Cocaine need never be used for permeation analgesia and it certainly should never be injected. A wide margin of safety has been provided by the adoption of procaine for infiltration and regional and of percaine for surface, infiltration and regional analgesia.

The greatest amounts of procaine and percaine that should be administered to an adult male in good physical condition and weighing 10 stone are:—

Procaine	{	0.5 per cent. solution	...	...	...	200 c.c.
		1.0 per cent. solution	...	...	...	75 c.c.
		2.0 per cent. solution	...	...	...	25 c.c.
Percaine	{	1 : 2000 solution	...	...	...	250 c.c.
		1 : 1000 solution	...	...	...	120 c.c.
		2 : 1000 solution	...	...	...	35 c.c.

These doses should be reduced in cachectic, toxæmic and thyrotoxic patients and in those cases where the area to be dealt with is a vascular one, such as the head and neck. Females and young adults require less. With very few exceptions, local analgesia is not a method of choice for children.

The same amount of procaine or of percaine in high dilution is more toxic than in low dilution. The weaker solution is absorbed less rapidly. The clinical features of intoxication produced by overdose of local analgesics are excitement, dilatation of the pupil, increased rate and depth of respiration, increased rate and diminished volume of the pulse and tremors. These

may progress to unconsciousness, convulsions and finally death. The treatment for convulsions when they do occur is the cautious injection intravenously of a short-acting barbiturate; 3 to 6 c.c. of a 5 per cent solution of pentothal sodium.

(b) *Inadvertent Intravenous Injection.*—The introduction of a local analgesic solution directly into a vein may lead to generalized clonic spasms or to syncope, syncope being the commoner occurrence. Adrenaline, whether in the nature of an addition to the solution or of an excessive secretion into the circulation of the suprarenal glands induced by fear and apprehension in an inadequately premedicated patient or stimulated by the local analgesic itself, increases the liability to cardiac failure. The actual cause of death in these cases of sudden syncope is almost certainly ventricular fibrillation as occurs with the chloroform-adrenaline and cyclopropane-adrenaline combinations. Animal experimentation suggests that the preliminary injection of a full dose of atropine should prevent or diminish the effects of adrenaline poisoning. The importance of adequate preparatory sedation, especially with a drug of the barbiturate series, is emphasized. In infiltration analgesia, intravenous injection of the solution can be avoided by keeping the point of the needle moving during injection and by injecting only during the movements of withdrawal. In nerve block analgesia, where a large volume of a strong solution is injected with the needle fixed, the aspiration test must always be negative and the injection must be made slowly.

The treatment of convulsions has already been described. When sudden syncope occurs, immediate cessation of injection must be followed by prompt efforts directed towards the re-establishment of an efficient circulation—adoption of a steep Trendelenburg position, rhythmic inflation of the lungs with a 5 per cent carbon dioxide—95 per cent oxygen mixture or with pure oxygen, artificial respiration by manual compression of the chest wall if no pressure is available and, if no response is elicited by these measures, cardiac puncture and cardiac massage.

(c) *Idiosyncrasy.*—There is a small and unpredictable proportion of patients who display an idiosyncrasy towards local analgesics employed in ordinary therapeutic doses. Rapid collapse and death has resulted from the mere application of trivial amounts of cocaine solution to mucous membranes and from the injection, after a negative aspiration test, of a dose of procaine solution less than the therapeutic maximum in infiltration and regional analgesia. Idiosyncrasy to the cocaine substitutes is less common than to cocaine itself. Cocaine has many fatalities to its discredit, procaine fewer and percaïne fewer still. The previous administration of a barbiturate hypnotic or narcotic diminishes the risk of the unexpected and almost instantaneous collapse due to susceptibility sometimes associated with the use of local analgesics. Atropine, hyoscine, morphine and chloral hydrate are of little value as prophylactics. At the first sign of circulatory failure the

application or injection must be terminated forthwith and resuscitative measures instituted without delay. Therein lies the only hope of recovery.

(2) Remote toxic effects may occur locally at the site or in the neighbourhood of the application or injection of local analgesic solutions after a period of hours or days. Local irritation of the tissue may result in an appreciable delay in the healing of operative wounds and if allied with excessive vasoconstriction may occasion, in debilitated patients and in those suffering from trophic or vasomotor disorders, extensive sloughing precipitating, perhaps, a fatal issue. The introduction of infection consequent upon lack of attention to surgical cleanliness or the dissemination of infection due to insertion of the needle through septic tissues is inadmissible. Local analgesics should be made up in sterile isotonic form and are best kept in all-glass ampoules. For procaine solutions the glass must be alkaline-free. Prolonged storage even in vacuum packing leads to a lowering of the pH (increased acidity) of procaine solutions. It is difficult to maintain the sterility of solutions kept in glass-stoppered bottles or rubber-capped bottles, particularly in tropical countries. It is claimed for "Novutox", a proprietary preparation of procaine, that it is self-sterilizing. Experience in West Africa has substantiated the assertion. The volume of adrenaline or of the more recent synthetic epinine or cobefrin when added to solutions to secure the advantages of local ischæmia, prolongation of the analgesic action and delayed absorption of the drug into the circulation, should be the smallest possible which will secure the desired results. Where sepsis is already present in the field of operation distant field-block or nerve-block analgesia is indicated.

Cases have been recorded of disease of the central nervous system following surgical procedures carried out under local analgesia. No satisfying, unequivocal explanation has been offered to account for them.

THE TREATMENT OF ACUTE BACILLARY DYSENTERY WITH SULPHAPYRIDINE. A POSSIBLE EMERGENCY SUBSTITUTE FOR SULFAGUANIDINE.

BY CAPTAIN T. R. SAVAGE.

Royal Army Medical Corps.

SULFAGUANIDINE has an established place in the treatment of acute bacillary dysentery and, following the work of Reitler and Marberg in the Government Hospital, Haifa, it has become fairly well known that sulphapyridine (M & B 693) has also a specific effect on the various types of bacillary dysentery.

These notes record the treatment with sulphapyridine of a small number

of cases which was limited by lack of clinical material and for this reason may be criticized as inconclusive.

The observations were made between August and October, 1941, on soldiers and airmen between the ages of 20 and 40 years who were admitted to a General Hospital in the Middle East direct from their units stationed in permanent camps in the neighbourhood. In every case treatment was begun during the first few days of the disease. In a few cases castor oil or saline aperients had been given before admission but this did not appear to effect the subsequent treatment with sulphapyridine nor the course of the disease.

After a diagnosis of clinical dysentery had been made, a full twenty-four hours period was allowed to elapse before beginning sulphapyridine. During this period one or more fresh specimens of stool were sent to the laboratory for culture. With two exceptions only cases in which an organism was isolated are recorded. A convenient type of chart which was used for noting the number and appearance of the stools of each case is shown below. It is worded specially for the patient's use.

DYSENTERY STOOL CHART.

Date	Score	Total per 24 hours	Consistence. Watery. Semi-formed Formed	Blood	Mucus	Gripping pain across stomach	Pain while passing

TABLE SHOWING RESPONSE TO TREATMENT WITH SULPHAPYRIDINE.

(1) Case	(2) Day of disease at start of treatment with sulphapyridine	(3) No. of stools in 24 hours prior to treatment	(4) No. of days on drug to achieve 3 or less formed stools	(5) No. of days with fever whilst on drug	(6) Organism	(7) maximum temperature	(8) Total dosage and frequency grm. i.d.s.
1	4	20	1	0	Flexner	99.4	5.0 ..
2	4	40	3	0	Bacillary exudate	102.8	11.5 ..
3	3	40	3	1	Flexner	100.0	9.5 ..
4	5	18	2	0	Flexner	100.8	6.0 ..
5	5	50	2	1	Flexner	103.4	8.0 ..
6	4	20	5	0	Shiga	98.8	13.0 ..
7	5	12	2	0	Flexner	99.6	7.5 ..
8	6	15	3	3	Mannite fermentor	101.6	11.5 ..
9	4	56	9	2	Shiga & flexner	101.6	31.0 ..*
10	7	22	2	0	Flexner	103.4	6.0 ..
11	4	40	2	2	Flexner	102.0	14.0 ..
12	4	14	2	1	Shiga	100.4	10.5 ..
13	2	20	4	0	Schmitz	99.4	12.5 ..

* Double infection. Inadequate initial dosage and should have been given 4 hourly.

SUMMARY.

(1) *Response of a Typical Case.*—In general it was found that well within forty-eight hours of starting to give sulphapyridine almost striking improvement had taken place. The frequent stools were controlled, the temperature had fallen to normal, colic, tenesmus and abdominal tenderness had disappeared, the tongue became clean and moist. The response was most rapid in Flexner cases. A common feature of the stools as they became formed was the persistence of superficial mucus.

(2) *Dosage.*—One gramme t.d.s., proved quite satisfactory for mild cases but this was inadequate for severe cases. In one case of moderate severity due to a double infection (Shiga and Flexner) the poor result must be attributed to this low dosage. An initial dose of 2 grammes followed by 1 gramme four hourly must be given from the first in toxic cases as judged on clinical grounds. It was usually forty-eight hours before an organism could be isolated. A total of less than 15 grammes was enough for all but one.

(3) *Toxic Effects.*—The usual depression which accompanies sulphapyridine was noticed. Nausea but no vomiting occurred in one or two cases. An erythematous rash was noted in one case.

(4) *Diet.*—This is an important part of the treatment. The following plan was used :—

Stages of Disease.

While colic, tenesmus, blood and mucus in stools are present.

While there are less than six fluid stools without blood or mucus per twenty-four hours. Colic and tenesmus absent.

One to three formed or semi-formed stools a day. No symptoms.

Diet.

Water, lime juice, barley water, glucose, beef tea.

Jellies, custard, arrowroot, corn-flour, scrambled eggs, rice, diluted milk, cornflakes, treacle, cocoa, bread, butter and biscuits.

Chicken diet. No fruit or green vegetables.

(5) *Morphine.*—This was found to be of great benefit in the early stages for producing sleep and for diminishing the number of stools. It appeared to do no harm.

(6) *Intravenous Saline.*—This was not required. In the most severe cases dehydration had not become marked before the symptoms were controlled.

CONCLUSIONS.

Where sulfaguanidine is available it appears to be the drug of choice, because of its specific effect, its low toxicity and absence of the malaise and depression caused by sulphapyridine; but, as a substitute, especially in an emergency for serious cases of Shiga dysentery and in markedly reducing the length of the disease of the milder bacillary infections, sulphapyridine seems to be well worth using.

My thanks are due to Colonel H. D. F. Brand for permission to publish these notes and to Major Ian Gordon, R.A.M.C., for his help and advice.

REFERENCE.

REITLER, R., and MARBERG, K. *Brit. Med. Journ.*, 1941, I, 277.

A CASE OF CEREBRAL CYSTICERCOSIS.

BY CAPTAIN A. P. PRIOR.

Royal Army Medical Corps.

Graded Pathologist to a Military Hospital.

THE association of cerebral cysticercosis with epilepsy has of recent years become fairly well recognized. Since the publication of MacArthur's paper in 1934 (MacArthur, 1934) there has every year been some publication in English journals on the subject and often quite an amount of discussion. The present case is presented with a view to recording one or two minor points of difference from the classical, clinical and pathological story.

The patient was an East African native who was admitted to the care of a British Military Hospital suffering from pneumonia. His illness was of one day's duration. He was stated to have been always of a lethargic and dull type and unlikely to complain. Within a few hours of his admission he showed generalized twitching of the limbs and rapidly passed into status epilepticus. No obvious cause could be found for this in blood urea, blood sugar, or from routine investigations of cerebrospinal fluid. In addition the urine was examined but like the body fluids it was within normal limits for fever. No malarial or other parasites were found in the blood.

The fits continued without relief and the patient died in a state of coma within twenty-four hours of his admission.

At post-mortem there was present a number of scars on the limbs such as are common in this type of native. On the skin of the trunk was a number of small discrete papular masses, the largest of which was some 0.4 cm. in diameter. The lungs showed lobar consolidation at a more advanced stage in the left lung than in the right. There was no other gross abnormality in the viscera of the thorax or abdomen.

Within the cranial cavity there was some slight excess of cerebrospinal fluid. There was some flattening of the convolutions of the right cerebral hemisphere. The superficial vessels showed some congestion. Within the grey matter of the cerebrum and in some cases actually protruding on to the surface was a number of small discrete tumours, each of about 0.4 cm. diameter, all of elastic feel and gelatinous texture. Seven of these were present in the cerebrum. They did not cut when the brain substance was incised and they could be extruded from the grey matter by the application of a little pressure.

On finding these tumours a detailed search was made for the indications of the presence of *tænidæ* but none was found. Sections of the tumours and scars of the skin showed only scar tissue.

The sections of the brain tumours all show larvæ of *cysticercus cellulosæ*. Surrounding the larvæ was a condensation of neuroglial tissue but surround-

ing this was no evidence of regeneration of cellular response. A considerable quantity of fluid was present within the sac so that the embryo was widely separated from the greater part of the wall and could only be seen in relation to the furthest portion of the wall in very low magnifications.

The sections of the cysts presented the appearances that have been described by Dixon and Willis (1941) as "healthy" and as "symbiotic." There was no evidence of disintegration, of calcification or of cellular response of the surrounding cerebral tissue.



Oblique section through the scolex showing well-preserved "healthy" larva. The area of neuroglial condensation and absence of cerebral cellular response can be seen.

DISCUSSION.

The present case presents certain differences from the usual story. The patient in this instance required the intercurrent of an acute infective process to bring to light cerebral symptoms.

So far as one can gather, in none of MacArthur's cases (*loc. cit.*) was this a feature. Similarly in report by Hare (1938), Alexander (1937) and Ewing (1941) this does not seem to have occurred. The absence of any cutaneous manifestations inclines one to review one's technique particularly in view of MacArthur's remarks. This has been carefully done but the possibility of having missed a cutaneous or muscular lesion in a post-mortem subject must be borne in mind. Tull (1935) records a more or less similar case wherein no subcutaneous nodules were found but where the brain showed more lesions of the classical type.

In this case probably the most striking feature is the absence of cellular response of the brain and the presence of so-called "healthy" or "symbiotic" scolices giving rise to symptoms. All the authors consulted agree that the time when the parasite becomes dangerous to the host is when disintegration and calcification set in in the scolex and the cerebral substance shows cellular changes. Dixon and Willis are most insistent on this point. It would appear that in the present instance the living cysts have, under the stimulus probably of an acute systemic disease, imbibed fluid, making them tense and thus giving rise to symptoms.

SUMMARY.

A case of cerebral cysticercosis with cerebral symptoms but showing "healthy" scolices in the brain and no scolices elsewhere is recorded.

ACKNOWLEDGMENTS.

My thanks are due to Colonel J. S. K. Boyd, D.D.P., M.E.F., for help and advice, and to Captain Kuschlik, S.A.M.C., for clinical notes.

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 HARE (1938). *Journ. Amer. Med. Assoc.*, **III**, August 6, 510.
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AN ANALYSIS OF 215 CASES OF DYSPEPSIA WHERE A BARIUM MEAL WAS DONE.

BY LIEUTENANT-COLONEL G. R. MACNAB.

Royal Army Medical Corps.

THE cases were Service cases investigated in a Military Hospital during the period November, 1940, to August, 1941. The analysis is concerned chiefly with the relation of histories to X-ray findings.

The histories were not taken by any one person but mainly by general duty Medical Officers allocated to the medical wards. Similarly, the X-ray investigations were not carried out by one radiologist; some three or four radiologists are concerned over the period.

(1) As a rule if the radiologist reported an ulcer present no further investigation was done.

(2) Fractional test meals are not considered in this analysis.

(3) As many cases, "negative" on radiography, gastric ulcers and "operated stomachs," as circumstances allowed were gastroscoped.

Total cases : 215.

Total	54
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Reviews.

FRACTURES AND DISLOCATIONS. BY VARIOUS AUTHORS. "The Practitioner" booklets edited by Sir Humphry Rolleston, Bt., and Alan Moncrieff, M.D., F.R.C.P., published by *The Practitioner*, in conjunction with Eyre and Spottiswoode, London, 1943. Pp. 104, figs. 25. Price 7s. 6d.

This booklet is the eighth of an excellent series and contains eight articles revised since their original publication in *The Practitioner*. It is of such a size that it will go into a coat pocket. The articles represent, in brief form, the treatment of fractures and common injuries.

The description of treatment compressed into few words is exceptionally clear and stress is laid on detail, which will be of help to readers. Notes on treatment after primary reduction and on prognosis are to the point. When alternative methods are given, indications for such are reasoned.

The articles on fractures of both bones of the leg (Alan Perry), on those around the shoulder (Professor O'Malley) and on those of the femoral neck (Professor McMurray) provide the reader with details and expert advice which can be studied quickly as everything is stated clearly and concisely.

The complications of supracondylar fractures at the elbow are brought to notice. The author (A. Rocyn-Jones) states when he considers it should be possible to make a diagnosis of a vascular complication; he advocates removal of splintage and lessening of the angle of elbow flexion in the first place when such complication is feared. If relief is not obtained in a few hours a division of the fascia in front of the elbow is advised.

After a clear paragraph on the pitfalls in establishing the diagnosis of fracture of the carpal scaphoid, the writer (E. L. Farquharson) advises methods of treatment which have failed, during this war, to produce wrists which can stand up to the demands of the Services and industry.

The chapters on head and spinal injury (Harvey Jackson and Geoffrey Jefferson respectively) are invaluable; the subject matter is brief, up to date and presented in a manner such as appeals to the medical reader.

The treatment of open fractures is described, in the chapter on elbow injuries, under the heading of "Compound Fractures and War Wounds."

The line drawings throughout are neat and explain the text. The index is lavish.

It is hoped that further articles may go to form another booklet on injuries that are frequent but perhaps not so common as those which have been well chosen for this volume.

ST. J. D. B.

THE OPHTHALMIC PRESCRIBERS CODEX. By Francis E. Preston, D.O.M.S.
London: H. K. Lewis & Co., Ltd. 1943. Pp. vi + 176. Price 10s. 6d.
net.

This little book is described in the Preface as a reference book intended for Ophthalmologists who may have little time to familiarize themselves with old and new remedies. It is stated that the aim of the author has been to make it a summary of the practice of others, and a very comprehensive and useful summary it is.

The book is conveniently divided into sections. In the Formulary section it is a pity that official names are not used throughout, giving the unofficial or proprietary name (where necessary) in brackets. It may be confusing, for example, to have in one place "Guttæ Hyoscinæ (Scopolaminæ Hydrobromide)" and in another "Occulentum Scopolaminæ (Hyoscinæ)." Similarly, the list of synonyms is rather added, no distinction being drawn between the official and unofficial.

The section on Abridged Treatment is good, and makes this a worthwhile volume for the Occulist and General Practitioner alike. C. E. G.

PHYSICAL EXERCISES FOR ASTHMA. Fourth (Revised) Edition, 1943.

Approved by the Honorary Medical Advisory Committee of the Asthma Research Council. London: H. K. Lewis & Co., Ltd. Pp. 26. Price 1s. net.

This is an excellent little booklet of physical exercises for asthma, well illustrated and well presented. Considerable thought has been given to the construction of exercises most suited to the particular needs of the asthmatic where the difficulty lies mainly with expiration.

While appreciating the usefulness of the hissing sound made with the lips and teeth "in fixing the patient's attention on blowing out as long as possible" it is unfortunate that a system which aims at correction of a faulty breathing mechanism should have to teach the procedure of "in through the nose and out through the mouth" which is quite incorrect for ordinary quiet breathing.

In exercise 9 (page 19) there is a great tendency to achieve the required position of lower back against the support by flexion of the knees. The instructions with this exercise should include the warning "keeping the knees straight."

Part III, Children's Exercises. The danger with the "blow football" type of exercise is over inflation of the lungs.

A most important factor is noted on page 22 under Note (ii) where the smooth continuity of the breathing is emphasized. This rhythmical rise and fall of the respiration should be emphasized in the exercises in Part I dealing with adults.

J. W. T. P.

Notices.

THE ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.

HARBEN GOLD MEDAL.

SIR HENRY HALLETT DALE, Kt., *G.B.E.*, F.R.S., M.A., M.D., D.Sc., LL.D., F.R.C.P., has been awarded the Harben Gold Medal by the Executive Committee of the Council of the Royal Institute of Public Health and Hygiene.

This medal, which is international in character, was instituted in 1894 by virtue of a trust created by the late Sir Henry Harben, the then Master of the Worshipful Company of Carpenters, and is conferred every third year for "eminent services rendered to the Public Health."

The first Harben Gold Medal was awarded in 1895 to Professor Louis Pasteur, and the list of medallists contains the names of Lord Lister, Professor Robert Koch, Professor Elie Metchnikoff, Major General William C. Gorgas, Sir Ronald Ross, Professor Sir Frederick Gowland Hopkins and Sir Leonard Hill.

SMITH AWARD.

Dr. James Fenton, *C.B.E.*, M.D., M.R.C.P., D.P.H., Medical Officer of Health, Royal Borough of Kensington, has been awarded the "Smith Award" by the Executive Committee of the Council of the Royal Institute of Public Health and Hygiene.

By virtue of a trust created by the late Sir William Smith, founder of the Royal Institute of Public Health, a bronze figure of Hygeia is awarded every third year to a medical officer of health who is recognized as having done the most noteworthy work in the discharge of his official duties.

PRIZE ESSAY COMPETITION ON INDUSTRIAL DESIGN.

An essay competition on industrial design, open to members of H.M. Forces of either sex, is announced by the Royal Society of Arts.

Competitors are asked to give, in not more than 2,000 words, a reasoned scheme as to practical steps to be taken (*a*) to increase the general appreciation by the public of well-designed things, and (*b*) to improve the method of education and training of those who desire to become designers for industry. No mention must be made of weapons of war, equipment, etc.

The first prize is for £20; the second for £10; and the third for £5.

Essays must reach the Secretary, Royal Society of Arts, "Westfield," Purley, Reading, Berks, not later than August 1, 1943. Army competitors must send their essays through their Commanding Officers.

"HYPOLOID" "METHEDRINE" *d*-N-METHYLAMPHETAMINE
HYDROCHLORIDE.

"Hypoloid" "Methedrine" *d*-N-Methylamphetamine Hydrochloride, the issue of which is announced by Burroughs Wellcome & Co., is a sympathomimetic pressor agent with a prolonged action. It is intended primarily for administration before or during operation to maintain the blood-pressure and guard against shock, particularly when spinal anæsthesia is used; it is claimed that a single injection is sufficient in the majority of cases. The drug is also stated to be of value as an analeptic in collapse or poisoning from overdosage of anæsthetics or narcotics or exposure to noxious gases. "Hypoloid" "Methedrine" is issued for intravenous, intramuscular or subcutaneous injection in ampoules containing 30 mgm. in 1.5 c.c. Prices (subject to professional discount) are as follows: boxes of 6, 3s. 9d. (purchase tax 5½d. extra); boxes of 25, 13s. 6d. (purchase tax 1s. 8½d. extra).

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in **duplicate** through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps, and articles of a non-scientific character, may be accepted for publication under a *nom-de-plume*.

All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps," will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

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JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS

Corps News.

MAY, 1943.

EXTRACTS FROM THE "LONDON GAZETTE."

May 4, 1943.—The KING has been graciously pleased to give orders for the following appointments to the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in the South-West Pacific:—

To be Additional Members of the Military Division of the said Most Excellent Order.

Capt. (temp. Major) Lewis Ernest Charles Davies, M.B. (96670), Royal Army Medical Corps.

Capt. (temp. Major) John Robert Kellett, M.B. (66477), Royal Army Medical Corps (Dublin).

The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division), in recognition of gallant and distinguished services in the South-West Pacific, to the undermentioned:—

No. 7520549 Pte. Edwin Buffton, Royal Army Medical Corps (London, W.13).

No. 7260197 Cpl. (actg. Sjt.) Arthur Llewellyn Evans, Royal Army Medical Corps (Belfast).

No. 7263387 Sjt. (actg. W.O.2 (Q.M.S.)) Thomas Glancey, Royal Army Medical Corps (Blackrock, Victoria, Australia).

No. 7520486 Cpl. (actg. Sjt.) Albert Morgan, Royal Army Medical Corps (Haywards Heath).

No. 7264507 Pte. Ronald George Morris, Royal Army Medical Corps (Rhondda).

The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in the Middle East:—

The Military Cross.

Capt. (temp. Major) George Henry Gilbert Hope (97171), Royal Army Medical Corps (Coupar Angus, Perthshire).

April 16.—Col. (temp. Brig.) (actg. Maj.-Gen.) P. H. Mitchiner, *C.B.E.*, *T.D.*, M.D., M.S., F.R.C.S., K.H.S. (2162), T.A., to be temp. Maj.-Gen., April 15, 1943.

Col. A. S. Heale, *M.C.*, late R.A.M.C. (3030), having completed four years in the rank, is retained on the Active List supern. to estab., April 16, 1943.

Major (temp. Lt.-Col.) R. H. C. Pryn (15538) to be Lt.-Col., April 16, 1943.

Lt.-Col. (temp. Col.) F. S. Gillespie, M.D. (8651), from R.A.M.C., to be Col., April 16, 1943, with seniority April 11, 1940.

April 20.—Lt.-Col. A. L. Robertson, *O.B.E.*, M.B. (8755), having attained the age for retirement, is retained on the Active List, supern. to estab., April 17, 1943.

April 23.—Col. (temp. Brig.) T. O. Thompson, *C.B.E.*, D.M. (4850), to be a D.D.M.S., and is granted the paid actg. rank of Maj.-Gen., July 31, 1942.

April 27.—Col. W. B. Rennie, *M.C.*, M.B. (11015), late R.A.M.C., having reached the age for retirement, retires on ret. pay, Sept. 20, 1941. (Substituted for notfn. in Gazette (Supplement) dated Sept. 19, 1941.)

Col. (temp. Brig.) E. C. Beddows, *M.C.* (8069), late R.A.M.C., having attained the age for retirement is retained on the Active List, supern. to estab., April 27, 1943.

April 30.—Lt.-Col. (temp. Brig.) R. R. G. Atkins, *M.C.*, M.D. (5754), to be Col., April 27, 1943, with seniority April 22, 1940.

May 7.—Capt. A. J. Clyne, M.B. (63071), to be Major, Mar. 27, 1943.

Lt.-Col. R. A. Flood, *M.C.*, M.B. (4862), retires on ret. pay, May 8, 1943.

Memoranda.

Col. W. B. Rennie, *M.C.*, M.B. (11015), late R.A.M.C., at his own re-

quest reverts to the rank of Lt.-Col. whilst so empld., Nov. 4, 1941.

Major (Qr.-Mr.) J. S. Webber, *M.B.E.* (35614), *E.R.E.* List, to be Lt.-Col. (Qr.-Mr.), April 14, 1943.

May 11.—Lt.-Col. W. Frier, *M.B.*

(15670), from *R.A.M.C.*, to be Col., March 25, with seniority April 1, 1940.

Major (temp. Col.) A. J. Bado (5169) to be Lt.-Col., April 27, 1943.

May 14.—Major (War Subs. Lt.-Col.) (temp. Col.) B. J. Daunt (14794) to be Lt.-Col., April 17, 1943.

THE ARMY DENTAL CORPS.

April 20.—Lt.-Col. H. O. Sumerling (15739) having attained the age for retirement, is retained on the Active List supern. to estab., March 4, 1943.

April 23.—Capt. O. E. Howell (58952) to be Major, April 19, 1943.

April 30.—Maj.-Gen. D. Clewer, *C.B.* (14233), retd. pay, to be Col.-Commdt., April 16, 1943.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

April 20.—Principal Matron Miss I. E. Kinkead, *A.R.R.C.* (206256), retires and remains empld., May 13, 1942.

Principal Matron Miss I. E. Kinkead, *A.R.R.C.* (206256), at her own request,

reverts to rank of Matron on re-emplt., May 13, 1942.

May 11.—Sister Miss L. M. Holland (206366) retires on account of ill-health, April 23, 1943.

ROYAL ARMY MEDICAL CORPS COMFORTS GUILD.

The Committee of the Royal Army Medical Corps Comforts Guild acknowledge with grateful thanks the following list of donations to the Fund during March, April and May, 1943. In addition, several individual subscriptions have been received in bankers orders (half yearly) from officers serving overseas:—

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DEATHS.

CHAMBERS.—In Chard, Somerset, on April 15, 1943, Lieutenant-Colonel Alexander Jasper Chambers, R.A.M.C., retired. Born in Blackrock, Co. Dublin, Oct. 3, 1868, he was commissioned Surgeon Lieutenant July 27, 1892. Promoted Surgeon Captain July 27, 1895, and Major, R.A.M.C., July 27, 1904, he retired July 27, 1912. He held the Retired Pay appointment at Lichfield from June 4, 1913. He was recalled to the Active List Nov. 19, 1914, and relegated to Retired Pay Oct. 15, 1919. He was again re-employed and in charge of Detention Barracks, York, from Oct. 21, 1919, till Aug. 31, 1922. He served in South Africa 1899-1902, taking part in the relief of Kimberley, operations at Paardeberg, action at Dreifontein, operations in the Transvaal and operations in Cape Colony. He received the Queen's Medal with four clasps and the King's Medal with two clasps. In the list of Feb. 24, 1917, and the communique of Sept. 18, 1917, he was brought to notice for valuable services rendered, and in the Birthday Honours, June 3, 1919, he was promoted Brevet Lieutenant-Colonel.

GALLIE.—In Dorchester, on May 1, 1943, Major-General James Stuart Gallie, C.B., C.M.G., D.S.O., late R.A.M.C., retired. Son of the late John Gallie, of Queenstown, Co. Cork, he was born there March 20, 1870. Commissioned July 27, 1898, he was promoted Captain July 27, 1901, Major April 27, 1910, Lieutenant-Colonel March 1, 1915, Brevet Colonel June 3, 1919, Major-General July 10, 1926, and retired March 20, 1930. He was appointed Honorary Surgeon to the King Sept. 15, 1926, and created C.B. January 2, 1928. He served in France from Aug. 20, 1914, till April 22, 1919. Six times

mentioned he was created C.M.G., promoted Brevet-Colonel and awarded the D.S.O., 1914 Star and Clasp, British War and Victory Medals.

PERRY.—In Hove, on May 3, 1943, Lieutenant-Colonel Samuel James Chatterton Prittie Perry, R.A.M.C., retired. Born March 4, 1868, he took the qualifications of the R.C.P. & S.I. in 1892 and the F.R.C.S.I. in 1901. He obtained the 1st Junior Surgical Prize at the Meath Hospital in 1889, and the Silver Medal for Operative Surgery R.C.S.I. in 1892. Commissioned Surgeon Lieutenant Jan. 29, 1895, he was promoted Surgeon Captain Jan. 29, 1898, Major R.A.M.C. Oct. 29, 1906, and Lieutenant-Colonel March 1, 1915. He retired April 30, 1920. He served on the North West Frontier of India in the Tirah Expedition in 1897-1898, obtaining the Medal with two clasps. He served in France from Jan. 25, 1918, till Feb. 5, 1920, being created a Commander of the Order of Avis.

BAKER.—In Hindhead, on May 6, 1943, Lieutenant-Colonel William James Baker, R.A.M.C., retired. Born in Jersey, Dec. 17, 1857, he took the M.R.C.S. in 1879 and the L.R.C.P. in 1880. Commissioned Surgeon, afterwards Surgeon Captain, Feb. 5, 1881, he was promoted Surgeon Major Feb. 5, 1893, and Lieutenant-Colonel Feb. 5, 1901. He was on half pay from Aug. 7, 1894 till May 19, 1895. He retired March 25, 1911, but was re-employed Nov. 28, 1916, till Sept. 14, 1917. In South Africa, 1899-1902, he took part in the operations at Colesberg Jan. 1 to 6, 1900, action near Pretoria and operations in Orange Free State, being awarded the Queen's Medal with three clasps and the King's Medal with two clasps.



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OF THE Royal Army Medical Corps

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Original Communications.

ARMY MEDICAL SERVICES IN ACTION.¹

BY LIEUTENANT-GENERAL SIR ALEXANDER HOOD, K.C.B., C.B.E.,
K.H.P.,

Director-General, Army Medical Services.

You with relatives or friends fighting in the battles now going on must be specially interested to know what happens to them if they become casualties. You may be familiar with such names as Field Ambulances, Casualty Clearing Stations and General Hospitals, but have you ever seen one of these? If you were in the last war you'll remember the large hospitals in huts which were the Casualty Clearing Stations of those days. What of the Casualty Clearing Stations or C.C.S.s as we call them in this war?

Well, I can tell you something of them for I've seen them at work. I've seen them in buildings such as the village cinema or dance hall, in tents in the mud and in the desert. Let me picture one in tents, for most of those at work in Africa must now be in tents. Approaching it along a very straight road you suddenly come upon a sign-post with a red cross and an arrow pointing to a track leading at right angles off the road. It has been raining hard, there's a strong wind blowing and the track is very wet and muddy. In the distance are tents apparently scattered over a wide area of ground haphazard. Amongst them, some lorries, open-air cookhouses and further away ambulance cars. The tents soon resolve themselves into an orderly layout and as you draw closer you see that they are composed of tents closely knit together to form various parts of the Casualty Clearing Station. Now when I say tents I mean marquees, not like those we use for the Flower Show, but with double roofs and thick walls with openings in them for light and air. The first lot of the tents you come to are the recep-

¹ Broadcast on March 30, 1943.

tion wards. The sick or wounded men are carried from the motor ambulance cars on stretchers into one of these reception tents. The stretcher is first put on trestles while the doctor—and it's here that you have your very experienced doctor who decides on the best course to be followed for each patient—examines the patient and directs what is to be done. Very likely he's suffering from shock and he may go to what we call the resuscitation ward, in a tent which leads directly off the reception ward, to be revived. There he receives a blood transfusion and, if he's cold, and he very often is, he'll be warmed up with hot bottles and hot drinks. or he may go straight into a ward and be put to bed, or perhaps to the theatre to be dressed or to have an immediate operation, or again he may be sent to be X-rayed. It all depends on his condition, his wound or illness; but a word or two more about blood transfusions.

It is in the resuscitation ward, as I said, that the patient who requires reviving gets this treatment. You who are listening have given your own blood and know just how it is collected from the vein in the arm. I have seen it collected—perhaps from *you*—in the workshops, in the factories; and here, in this Casualty Clearing Station in the desert, you see the result. Those thousands of bottles which have passed through complicated processes have now resulted in either liquid or dried blood being available—the latter is used nearest the front line, and in its dried form it looks just like brown sugar. Anyone seeing this in a Casualty Clearing Station can't help thinking how you who've given it are indeed the blood brothers of our soldiers, and the whole Army overseas knows and appreciates how true that is. You can take it from me that the doctors in the Casualty Clearing Stations are enthusiastic about it, and the supply is so well organized that it has never failed—it has saved hundreds of lives.

There is no doubt that what you donors have done and what the scientists and doctors have done with your gift has been one of the greatest life-saving measures ever provided for any Army. The enemy have nothing like it—not that they've poor medical equipment, far from it. We've captured large quantities of German and Italian medical equipment; it's good and well packed but they depend on a synthetic product to take the place of blood transfusion in forward medical units, and I know that the German doctors themselves envy us our blood transfusion service.

But to return to the Casualty Clearing Station. About a hundred yards from the reception tents you find another group of marquees cunningly laced together to form a spacious operating theatre. The floor is just a plain bit of desert or earth with a tarpaulin over the mud. It has two operating tables and a Sister in charge. It's in the Casualty Clearing Station that the soldier first comes under the care of the Army nursing sisters.

Here is the surgeon's equipment laid out ready—all the necessities. And, where everything has to be packed and moved and where every move means petrol, weight has to be cut down; so for years the provision of the essentials has been studied and now we find that after three years of war the

medical and surgical equipment provided for the Army has stood the test well.

The operating theatres in the Casualty Clearing Stations always show little individual touches. In one the Surgeon may have devised a particular lighting system with the electric light plant which every Casualty Clearing Station carries. In another it is some gadget for heating the theatre or keeping it free from dust, and so on. All the essentials for modern surgery are there and, in addition to the dressings which the unit sterilizes for itself, large quantities are sent up in sealed tins from base hospitals by air. It looks very efficient and it is very efficient, for this reason. When later the results are seen in the patients in base hospitals who have been treated in the operating theatres in these Casualty Clearing Stations it's quite evident that the standard of treatment is of the very highest order.

You may be assured therefore that at the earliest possible moment our wounded are started off on the right road to recovery. Each Casualty Clearing Station—they are generally about 20 to 30 miles behind the front lines—can accommodate 200 patients, 50 in beds and 150 on stretchers, but the accommodation is very elastic and it can take in emergency two or three times that number. Casualty Clearing Stations are all expert at moving—you should see them pack up—each man knows his job and does it, each vehicle has its load and moves off at its appointed time. I've seen a Casualty Clearing Station move from a position about a hundred miles away, arrive in the evening, and be completely ready to take in patients the following morning. They've each a team of specialists, physician, surgeon, anæsthetist and X-ray specialist, and a dental officer is attached. Additional operating teams can be sent from base hospitals to join them in an emergency, and then a Casualty Clearing Station operating theatre can carry on round the clock. There are eight sisters in each Casualty Clearing Station and besides them there are R.A.M.C. nursing orderlies, cooks, etc.

A Casualty Clearing Station does life-saving work in its operating theatres and wards and, as soon as they can be moved, patients are sent back to a General Hospital at the base. They begin their journey in a motor ambulance car; and in that they may go back to the nearest railway and then down to the base by ambulance train, or they may go to a nearby port and be sent on a hospital ship, but the development of air transport enables us to send ever increasing numbers by air. In that case, a motor ambulance car takes the patient to the aerodrome where he's put into the plane on a stretcher and flies back to the base in two to three hours—a journey that by any other means would take at least thirty-six hours. From personal experience I know the journey in an ambulance plane is most comfortable, and the patients who've travelled by air are, as you can imagine, delighted to be moved back so easily.

Now a word about General Hospitals. They're all equipped in the same fashion, they all have a team of doctors, physicians, surgeons, specialists in X-ray and anæsthetics, and many of them have special sections for

various types of casualties. They have anything from forty to eighty trained sisters, and many R.A.M.C. men for the other tasks necessary in a modern hospital. Everything that can be done for the sick and wounded is possible in these units and they only differ in size and in their housing which depends on where they're located. The staff and equipment are sent off with the Force wherever it is going, and they are allotted accommodation, or perhaps a site, and told to establish their hospital. Some of them in the bigger towns may be lucky enough to go into buildings which were designed as hospitals, others find themselves in hotels or schools. I remember one in a hotel famous to tourists, and its ballroom made one excellent ward, while the dispensary was appropriately enough in the cocktail bar. Other hospitals are partially in tents and, where this is so, certain portions are in huts, such as operating theatres and the wards for the acutely ill. These hospitals are divided into two main divisions, medical and surgical, and patients according to their complaints are allotted to wards in these divisions. As a rule these hospitals "stay put" for a long time in one place, but they can be and are moved to meet any new situation. When one visits one of these hospitals one notices the great contrast between the wounded of this war and those of the last war. In the last war they were pale, worn out, and tired, and now the majority of the recently wounded are alert, bronzed and cheery. They might well be a group of convalescents who had recently been for a holiday by the sea, and not seriously wounded men from recent battles.

There's no doubt that the modern treatment of wounds—the plaster fixation, and the sulphonamide drugs—enables the surgeon at the front to fix up his patients so well that long journeys even by road and rail do him no harm. I agree, of course, that it would be ideal if all our patients could be evacuated to the base by air, but this is not possible, nor is it ever likely to be possible, because for one thing there are days when and places where no aeroplane could be used. So we have reason to be thankful that these modern methods make it possible for many long journeys by road and rail to be done with the minimum of pain and discomfort.

Following treatment in General Hospitals, the soldier, if he is likely to be fit to return to duty soon, passes on to a Convalescent Depot. I have seen lots of these, with patients going through from stage to stage until they come out healthy fit men able to return to their units. In these depots work and play and entertainment are mixed together from day to day and there are very few soldiers who pass through whose tastes and capabilities have not been catered for.

Picture then these Casualty Clearing Stations, General Hospitals and Convalescent Depots in all parts of the world, Middle East, West Africa, India, in huts, in hotels and in tents, or even in well lit caverns hewn out of the solid rock of Gibraltar, and rest assured that if any of your kith and kin are wounded or sick they will get the best that modern medicine and surgery can provide.

SUGGESTIONS FOR " BATTLE DRILL FOR STRETCHER-BEARERS ".

BY MAJOR R. O. MURRAY, M.B., B.CHIR.,

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INTRODUCTION.

CASUALTY evacuation in zone warfare presents many problems and difficulties that did not arise with trench warfare in which casualties occurred in greater concentration and in a relatively much smaller area so that their location was comparatively simple even though the risk to stretcher-bearers evacuating them was often very great. As a result, training of stretcher-bearers has been mainly directed to methods of evacuation and little attention has been paid to methods of searching for casualties in the vast areas of modern warfare. This is often dismissed with the assumption that the evacuation to the R.A.P. by regimental stretcher-bearers is an easy matter. Such an assumption is unwarranted. The greater distances involved mean that, quite apart from the difficulty of finding the casualties, fewer wounded will be able to walk to the nearest medical post; so that a greater proportion will require evacuation on a stretcher or by transport. The small number of bearers available prevents more than a few being moved manually as assistance from the infantry is likely to be hard to obtain. In addition, modern surgical experience has shown that operation within six hours allows not only a greatly increased chance of recovery but also a greatly reduced time of recovery so that speed is more than ever a factor of vital importance. Speed in movement is a prime demand of Infantry Battle Drill and teaching is given that, during contact with the enemy, there is not time to assist a wounded comrade by applying the first field dressing. Stretcher-bearers should therefore be disposed in such a way that they are able to take over the duty of providing immediate and essential first aid.

On the other hand the well equipped and well trained modern Army has several advantages which assist in the solution of the problem. In the first place the very mobility of this type of warfare militates against a recurrence of the seas of mud resulting from a heavy barrage by static artillery. Through the impassable morasses of the Western Front in the last war no vehicle could hope to travel and the only possible means of evacuation was manual carriage. Secondly, much more transport is available and its use in forward areas only slightly increases a risk that is already present, anywhere in the theatre of war, from bombing. Thirdly, improvement in communications within the infantry by means of wireless offers an opportunity of passing rapidly to the collecting bearers information about the numbers of casualties and the areas in which they have occurred. Fourthly, Infantry

Battle Drill teaching supplies a basis on which training for casualty evacuation may be developed. In order to make searching for casualties an efficient process, instead of haphazard hunting, systematized methods of training are required. These methods should be taught primarily to regimental stretcher-bearers but should also be learnt by Field Ambulance Company personnel. In this way stretcher-bearers of a Field Ambulance Section may be conversant with them and thus able to co-operate fully when the section is attached to a battalion group.

Medical Battle Drill is divided into two parts—firstly, *searching drills* in which no immediate enemy interference is anticipated and, secondly, *close support drills* in which the bearers co-operate intimately with the infantry during action against the enemy. It must be emphasized that this training deals solely with evacuation from the site of injury to the R.A.P. or Field Ambulance Section.

Drills are used to train personnel in routine methods for dealing with typical problems likely to occur in the field so that collection and evacuation become a process of automatic efficiency rather than allowing each separate circumstance to become a new problem demanding a new solution. Stress is continually laid on the importance of maintaining a high standard of discipline within the squad—which may consist of four privates—and of constant exertion of control by the squad-leader. In addition, the learner is always taught that the drill only provides a basis for initiative and that it should be his servant rather than his master.

A.—SEARCHING DRILLS.

General Principles.—Searching is carried out by individual bearers according to the drill in use. On locating a casualty, the bearer marks the position by some method such as plunging a bayonet, with rifle affixed, into the ground. First aid is only given at this juncture in cases of hæmorrhage. The wound is briefly typed before the bearer continues his search, on completion of which he reports to his squad-leader at a previously indicated rendezvous the location and number of casualties that he has found. The latter, on receiving these reports from the members of his squad, is at once able to assess the task before him. He then makes a plan of evacuation and gives his orders. After first aid has been given evacuation is carried out, the casualties being carried or assisted to the nearest point at which they may be collected by transport. Except in mountainous terrain, the distance to such points should never be great in this country or in Western Europe for it is hard to find a single square on the 1 inch to the mile map which does not contain a road or track; besides which much parkland and many fields are passable by transport. Long stretcher carries, therefore, should be rare so that a squad is not occupied for a long time dealing with one patient and bearers are therefore able to distribute their aid more equitably. Walking wounded are directed to the nearest point from which they can be collected.

When a section of three squads is employed the leader of each squad reports, after the search is completed, to the section commander, who is then able to allot his man-power according to the difficulties associated with the task. He must also arrange for at least two bearers to take charge of the transport and act as a loading squad. Furthermore, in making his plan of evacuation, he should continually adopt the solution offering the minimum physical strain for his men. An obvious example is to evacuate downhill rather than uphill where possible.

Before any drill by a section is carried out it is the duty of the section commander to make a brief reconnaissance, call up his order group (consisting of his three squad leaders) and give clear, well-defined orders, always concluding with the query "Any questions?"

In order to obtain the maximum efficiency from the training, every movement should be carried out at the double except when bearers are actually carrying patients. The ability to think and reason clearly while undergoing considerable strain is not easily acquired but, having been acquired, is one of the most valuable faculties of a well trained soldier.

(1) *The Sweep for Casualties*.—This organized method of searching an area is based on the open order advance of an infantry section with emphasis on all round observation. Numbers 1 and 3 bearers carry the stretcher, with the former in the rear so that he can exert maximum control while numbers 2 and 4 bearers are extended on either flank, the degree of extension depending on the type of the country being searched. It may be as little as 20 yards in long grass or scrub and may be as much as 100 to 150 yards in open parkland or ploughland.

The angles must be particularly watched by the individual bearer concerned. They overlap, so that the whole circumference is covered by the observation of at least one man.

The area to be searched must be defined before the sweep is begun. As indicated above the strip may be 60 to 400 yards broad and the length of the sweep is normally 300 to 400 yards. Thus a section of three squads working in line is able to search a considerable area quickly and thoroughly. The most efficient results are obtained when the direction of the sweep is made at right angles to a road or track as the bearers are then able to search on the outward journey and to evacuate on the return. When, however, it is necessary to search a large open area with a good surface (an area of grassland, for example) it is obviously more simple to order one or two bearers to drive around it in a truck. The sweep is used when this is impracticable.

(2) *Wood clearing* is simply an adaptation of the sweep, necessitating a much closer formation, but strips 100 to 150 yards broad can be swept by a section. The section commander must ensure that the line of bearers is kept straight and does not break up into two or more groups. Otherwise it is easily possible to miss casualties. Particular attention must be paid to marking their positions. Should one be hidden by undergrowth, it is advisable

to pull him clear of it and, in addition, it is found valuable to mark them with white direction signs carried by the bearers for this purpose. They must be placed so that they are easily visible when the bearers, having reported, return to evacuate the casualties, thus eliminating the difficulty of finding them again. The number of signs missing at the end of the sweep from the total used serves as a check on the number of casualties located. Sheets of paper may be used alternatively being fixed to branches in a conspicuous position. Carrying a casualty through a wood is strenuous work and consequently they should be cleared to the nearest edge and then to the road or collecting post except, obviously, in the case where one side of the wood is under enemy observation when visible movement would invite enemy fire.

Different sizes and shapes of wood demand variations of the drill. One strip of wood may only require two squads to search it while the third may be employed searching a nearby copse. Large woods should be searched by strips, direction being kept by compass. The squads should never be allowed to become widely separated or loss of control will inevitably result. In the same way liaison should always be maintained with the transport being employed.

(3) *Street Clearing*.—This drill also applies to small villages and farms which, together with woods, are localities likely to be held by the enemy as pockets of resistance and by-passed during a general advance, being left to be reduced by reserve troops. In such circumstances casualties to our own troops are almost inevitable. It is therefore wise to have a section of bearers with transport (1 ambulance for lying cases, and 1 30-cwt. vehicle for sitting cases) readily available in order to give immediate assistance after completion of the action. The orders given are brief, as in all battle drill, e.g. "No. 1 squad left, No. 2 squad right, No. 3 loading. Any questions? Move." Each searching squad then proceeds as follows. The stretcher is left on the road between the first two houses. The No. 1 then searches the gardens and out-houses while the No. 3 searches the interior by definite routine—basement, ground floor, first floor, attic. Nos. 2 and 4 at the same time deal with the second house. After searching, all report back to the stretcher and evacuation is carried out under the orders of the No. 1. As soon as casualties are brought to the street they are taken over by the loading squad which effects a shuttle service with spare stretchers and dressings carried on the transport. The wounded are then loaded under the supervision of the section commander, while the searching squad moves on to the next house, the transport being moved up to keep abreast of it. Should one squad finish more quickly than the other it is detailed to assist the latter. This method may be applied equally efficiently with irregular buildings, such as those encountered in a farm. In this case the squad leaders must define clearly to each member of their squads what buildings each must search. It is advisable to keep these "bites" small as otherwise one

bearer may be occupied for a long time while the remainder of his squad finish early and waste valuable time waiting for him. Each bearer must be fully conversant with methods of extracting wounded from awkward places, especially in letting them down from windows or roofs. First aid, apart from hæmorrhage which is dealt with immediately it is encountered, is mainly given in the transport by the ambulance orderly with the assistance of one member of the loading squad.

Adjuncts to Training.—(1) The "Sweep for Casualties" is taught in the first instance as a *parade ground drill*, in order that the fundamental principles may be thoroughly appreciated before it is used in the open country. The fact that this drill is new and unorthodox should not be allowed to become an excuse for slackness or untidy turnouts. All the usual smartness of the parade ground must be maintained.

(2) *The Provision of "Casualties."*—It is often difficult to find men whose time can be spared for this rather passive role. Sometimes it can be done by mutual exchange of two sections in training. As a substitute, straw-filled sandbags or white direction signs may be used. These may be marked (on the reverse side so that examination of the substitute is necessary) with the legends "1", "2", or "S". These indicate a useful method of abbreviating wound types as one-man, two-man or stretcher carries. These substitutes must be treated during evacuation with the respect that would be shown to a wounded man; e.g. one marked "S" must be placed on a stretcher and carried by at least two bearers.

(3) *Placing of casualties* should be made as logical as possible. For example, in street-clearing they should not be placed in totally inaccessible positions. It is not a game of "hide and seek." On the other hand, although logically casualties might be expected in the street itself, it is rather prodigal to place them where they are so easily found when the supply is limited.

(4) *Bombed streets* offer the most realistic training grounds and should be used wherever possible.

(5) *Blackboard schemes* are excellent for welding the three searching drills into a cohesive whole and preparing bearers for the sort of task they are most likely to face. An area from the map, preferably one square kilometre, is enlarged on the blackboard and details of the fields, with their crops, are filled in. A very brief description of the type of action presumed to have taken place is given. Each man is then asked to consider how he, as section commander, with, for example, 1 ambulance and 1 30-cwt. vehicle, would search the area. After a few minutes they form squad syndicates. This will be found to provoke much discussion and interest. The answers should be divided into phases, each being a complete movement with a rendezvous for the section and transport at the end. The best answer is then taken and the casualties located during each phase are marked

on the board, the men being asked to make a plan of evacuation for each phase in the same way.

Such schemes can be practised afterwards, on the ground, but it is more interesting for the men to be given an entirely fresh area.

B.—CLOSE SUPPORT DRILLS.

General Principles.—Bearers should be taught *fieldcraft* and *personal camouflage* to the highest possible standard. They must never, by failing in these, reveal to the enemy the infantry they support. They should also be taught *medical fieldcraft*, this being the approach to, and the removal of, the wounded man under fire both by day and by night. Wire offers a special problem as it is designed, not to prevent attack, but to hinder in order that defending troops may have a good opportunity to fire. Therefore casualties in its vicinity may be expected and the negotiation of such obstacles, with wounded, should be a part of this training. It may be possible on occasion for the bearers to be given a covering smoke screen in which case the stretcher makes a valuable improvised bridge.

Bearers should also have a knowledge of *elementary infantry tactics* in order that they may have a clear understanding of the general methods employed in infantry battle drill.

(1) *Drill for the Support of the Company in Defence.*—The squad attached to a company taking up a definite position should carry out the following routine: (a) Site a company first-aid post, near Company Headquarters, in a position sheltered from enemy fire and, if possible, close to a point attainable by transport. The only transport likely to come up to the position is a ration and ammunition lorry and that at night. (b) Dig slit trenches (carefully disposing of the soil) for themselves and temporary accommodation of wounded. All possible comfort should be given to the latter by such improvisations as beds made of bracken and roofs of branches. (c) Ascertain every platoon and section position, with any alternative positions or outposts that may be taken up. Every bearer must learn how to reach all of them both by day and by night. (d) Locate the nearest point to which an ambulance may be brought with reasonable safety. If required, request should be made by wireless to the R.M.O.

A drill for the use of the Bren-gun carrier in casualty evacuation should be taught in order that prompt action may be taken when the opportunity occurs. The squad may be kept intact at Company Headquarters, or one or more bearers sent out to platoon positions, depending on circumstances.

(2) *Drill for the Support of the Company in Advance.*—Two companies, covering a front approximately 1,000 yards, normally lead a battalion advance. They may operate several miles ahead of the main body. The tendency is to use roads in order that battalion transport may subsequently follow and even if this is not the case it is likely that some road or track will be found within the area.

To deal adequately with the casualties that occur in attacks against enemy strong-points it is desirable that two squads, with a N.C.O. in charge, should be available for each of these leading companies. The squad additional to the normal complement is found if possible for each of the leading companies from the resources of the attached Field Ambulance Section. This has three squads, the third being held in reserve at the R.A.P. When such assistance cannot be provided, a modified form of the drill can be practised with the one regimental squad available.

During the various forms of attack the infantry split up into groups and the aim of the medical services should be to cover each of these groups by the observation of one bearer, who may be able to watch the group he is covering from a distance of anything up to 100 yards. He is thus not unduly exposed to small arms fire. Particular attention must be paid to the troops taking part in the assault, among whom the majority of casualties may be expected to occur.

In order that the medical N.C.O. may fully understand the action, and thus be able to deploy his bearers rapidly, he becomes an integral member of the company order group, in common with the commanders of other supporting arms.

After the objective has been carried, the routine drill of locating, typing and reporting the casualties to the squad-leader is carried out and a plan of evacuation is made by him. If possible they are cleared to the axis of advance but, failing this, dumps of casualties may be formed or they may even, if time prevents these measures, be left in situ after essential first aid has been given. While this is being done it is the duty of the medical N.C.O. to ascertain how many casualties have occurred and to decide what method of disposal will be adopted.

This he reports to the Infantry Company Commander who incorporates the information in his routine report to Battalion Headquarters, stating progress, casualties and ammunition expenditure. In addition he indicates the earliest moment at which it will be reasonably safe for transport to move up. Should the casualties be left in situ the map reference of the area concerned should also be reported for the information of the R.M.O. The latter is then able to arrange the earliest possible collection of the casualties. If these are evacuated to a road or dump there is no difficulty in locating them but, if they are left scattered about the area, they must be collected by using the Sweep for Casualties. When possible, close support bearers should leave their casualties in ditches or hollows, especially if beside a road, in order that they may be protected from air attack. Immediately the close support bearers have completed their task they re-join the company which will have consolidated ahead. It must be stressed that the bearers should not be left behind if the company continues the advance, in which case collection must be left to reserve bearers using the searching drill. If this principle is neglected the company will find itself without any immediate medical aid.

With one squad only available, the processes of evacuation to the axis or dump formation are limited by the time taken by the company to re-organize and continue the advance. In this case the casualties must usually be left in situ as indicated above. Evacuation under these circumstances is inevitably delayed.

By using these methods, however, prompt first aid to the wounded is assured and every wounded man can at least be comforted by the knowledge that someone knows where he is.

(3) *Drill for River-crossing.*—Attacks over rivers by infantry usually take place at night for such natural obstacles provide a splendid defence line. Assault boats are customarily employed and are therefore available, after the crossing has been effected, for use by bearers in casualty evacuation. In order to allow this to be done with essential quietness and efficiency a routine method is taught.

Further training should also be given in the many excellent improvisations for evacuating wounded over water obstacles.

Adjuncts to Training.—(1) *Battle inoculation* should be practised to the fullest degree. In addition to its value as a preparation for actual battle it provides a great stimulus to morale. Fieldcraft schemes, in which wounded are removed under actual fire, should be carried out frequently.

(2) *Support of a company in defence* should be practised by having a suitable area selected by an infantry officer having each platoon and section position defined. Bearers may then acquire spatial relationships before attempting to carry out their drill.

(3) *Parade Ground Drills* may be used with advantage in the early stages of training in the support of the company in advance. They are used to convey the basic concepts only and serve as an introduction to somewhat complicated tactics. The nine armed R.A.S.C. personnel of a Field Ambulance Company (or one section of infantry) are used, each man representing one infantry group. White direction signs, marked as before, are dropped on whistle signals to represent casualties. In this way considerable economy in man-power is effected during training. When the routine has been learnt on the parade-ground *skeleton schemes* may be carried out using areas comparable to those employed by a whole company. Bearers should then be able to co-operate with a full infantry company including field-firing schemes.

A Parade Ground Drill is also used with advantage in the initial stages of assault-boat training.

DISCUSSION.

The methods described provide a system for the evacuation of casualties from forward battle areas. To be successful they must be used in training until the squad or the section develops a high standard of teamwork. In the case of the close support drills co-operation from infantry commanders is essential. The training of regimental medical personnel has sometimes been

sadly neglected and it is felt that this frequently results from lack of knowledge on the part of infantry commanders of the type of training that should be employed. Physical fitness, of course, is in this training a *sine qua non* and fit men only should be employed as stretcher-bearers.

The use of these methods stimulates morale in two ways. In the first place the infantry realize that, if wounded, detailed arrangements for their assistance do exist. Such an assurance must surely lead to even greater determination. In the second place, medical personnel are able to appreciate more clearly their role in action and acquire, after this training, a sense of pride of achievement which is of great value. This is particularly true in the case of N.C.O.s and, on occasion, this training may be the basis for action by non-medical officers R.A.M.C.

Casualties among bearers are certain to occur but it should be possible to replace them by having a trained reserve available with each infantry platoon.

SUMMARY.

(1) The necessity for a system of casualty evacuation from forward areas is indicated.

(2) Medical Battle Drill Methods are described, being divided into (a) Searching Drills; (b) Close Support Drills. Special reference is made to the principles involved.

Grateful acknowledgment is made for the continual encouragement and advice that has been given to the author during the development of this training by Colonel R. A. Broderick, *D.S.O.*, *M.C.*, *T.D.*, and also for the invaluable practical assistance of Lieutenant W. Barr and Regimental Serjeant-Major J. G. Brotherton.

SURGICAL EXPERIENCES AT A BASE HOSPITAL IN EGYPT.¹

BY LIEUTENANT-COLONEL A. McMILLAN,

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I PROPOSE to describe from a surgeon's point of view the arrival and setting up of a large General Hospital in a country abroad; the work encountered during a brief period of activity in the treatment of Battle Casualties; and some of the difficulties that arose.

The nth General Hospital arrived in Egypt and was sent to a prepared hospital site. The site lay in the desert near a road and two miles from the railway. The whole hospital was already laid out. There was a certain number of brick buildings and Nissen huts for administration, stores and wards but the greater part of the accommodation was to be in tents. There were adequate kitchens and annexes for both wards and staff.

The Surgical Division of 400 beds for other ranks consisted of:—

(1) Two brick-built special huts of thirty-two beds, designed for serious cases, containing six small side wards in addition to two large wards. These were used for any cases requiring a small ward and for chest and head cases.

(2) Four Nissen huts of twenty-two beds each, which made excellent light, airy and roomy wards, were allotted as fracture wards and given a staff experienced in orthopædic work and some extra equipment.

(3) The rest of the beds (280 in number) were in fourteen tents of twenty beds. The tents were sunk, their floors being about three feet below the ground as a P.A.D. measure, and had tiled floors. They were the ordinary brown hospital marquees and made excellent wards, their chief disadvantages being: (i) They were rather dark and gloomy. (ii) They were narrow so that the space between beds and tent poles was small. (iii) They were cold and not easy to heat. Our supply of oil stoves was insufficient. (iv) They were unpleasant during dust storms, when aseptic dressings were impossible. We were there in the favourable season and had only two severe sand-storms. On the whole however the tents were quite satisfactory. There was a separate Officers' Hospital of 120 beds, medical and surgical, arranged in much the same way. It proved to be much bigger than was ever required. During the rush period surgical cases overflowed into the medical wards.

There was a good theatre block which also contained the X-ray and massage departments. There were two theatres and a plaster room, with adequate space for sterilizing preparations and cleaning, though one could have suggested many improvements in design. Equipment was adequate

¹ A lecture delivered at the British Military Hospital, Poona.

and of excellent quality. We also had the equipment of a surgical team ready for immediate departure. In the theatre block there was an up-patient dressing centre with a minor operation room run by a sister and orderly. There during busy periods walking patients came from the wards for dressings, so relieving pressure on the wards. Minor operations and examinations were also done there. This was very useful as both the equipment and staff in the wards were rather meagre and, at busy periods, inadequate. The shortage of staff we got over by the use of Italian prisoners of war, who were quite good, and convalescent patients when available. Secondly, there was a transfusion centre consisting of a small resuscitation ward equipped with all required for urgent shock treatment, and a second room for the taking and storing of blood. Blood transfusion formed a most valuable part of the treatment of a number of cases and the collecting and typing of donors, the taking and storing of blood, the grouping of patients and the giving of the blood were all done by a team consisting of an officer, a sister and an orderly. It involved a good deal of work as most of the donors were patients in a neighbouring convalescent depot and were thus frequently moving on so that others had to be found and grouped. Six to eight pints of blood were kept in readiness in a refrigerator. Transfusions averaged ten or twelve a week. The theatres were adequate but large numbers of grossly infected cases were dealt with and, owing to pressure of work, it was impossible to keep a theatre for clean cases. We tried to rest one theatre for a day as often as we could for a thorough cleaning and any clean cases were done, if possible, after this. We did no clean bone or joint operations. Actually we had no cases of sepsis among our clean operations.

There was a good water supply laid on to wards and departments and electricity from a power station. We also had our own generator to light the theatre block and work the X-ray plant when needed. There was a black-out only during air-raids. The hospital was well planned and worked well, the main difficulty being the great distance from theatre and X-ray room to the more distant wards. This was to some extent unavoidable as the wards were widely spaced as a P.A.D. measure. But it was unnecessarily exaggerated by the placing of the theatre block at one end instead of in the middle. Patients were conveyed by wheeled stretcher and this occupied several minutes and was not a good thing after operation in the cold weather. The loss of time to the staff too was enormous. There was also difficulty in serving hot food from one central hospital kitchen. Eventually home-made hot plates were installed in the ward kitchens, heated by oil stoves.

Our Registrar, Major Pratt, worked out an ingenious system of receiving the convoys the objects of which were: (1) To avoid delay in sending cases to their wards; (2) to ensure that cases went to the right wards and that they were always sent to wards which had beds to receive them and (3) to have office records completed at once and accurately.

The patients on arrival went to the reception room—a Nissen hut—where there were two admitting Medical Officers and about six pairs of clerks at tables. There was also a board on which was a numbered disc corresponding to every empty bed in the hospital arranged by wards. From this board the Medical Officers could at a glance see where the empty beds were. The patients on arrival were taken straight to a table where the clerks entered their particulars, one on an I.1220 and the other on a special card for the hospital office card-index system. Six cases could be dealt with simultaneously and the operation took only one or two minutes. Meanwhile the Medical Officers went round examining the patients, allotting each to a ward and pinning a disc corresponding to a known empty bed to his coat. The cases then proceeded to the ward. 120 cases could in this way pass through in an hour. The discs were collected from the patients by the ward sister. The two cards went to the hospital office where a serial number was entered on each. The Index Card remained in the office and the A. and D. book was filled in from it after the rush was over. The I.1220 was sent at once by runner to the ward and was available for the Medical Officer within a few minutes of the patient's arrival. The discs were collected by the wardmaster and kept on a board in his office. When a patient left hospital and a bed became empty he returned the corresponding disc to the reception room. Thus the board in the wardmaster's office showed the occupied beds in the hospital while the board in the reception room showed the empty beds. The office had complete records at once and returns were facilitated. For clinical records the I.1220 was kept by the ward Medical Officer and when the case left hospital the notes were copied by a clerk on to a special card which was indexed in the wardmaster's office. We thus kept a complete clinical record of each case without adding to the busy Medical Officer's clerical work.

I have the case cards of 566 surgical cases.

Of the 566 cases 417 were war wounds the remaining 149 being :—

(1) Major surgical diseases	...	...	...	...	17
(2) Minor septic conditions	...	...	...	...	28
(3) Other minor surgical conditions	...	...	...	...	34
(4) Injuries (including 17 fractures)	...	...	...	...	57
(5) E.N.T. cases	...	...	...	...	10
(6) Eye cases	...	...	...	...	3

The disposal of the 566 cases was as follows: 11 died (all war wounds), 166 returned to duty and 33 went to a Convalescent Depot. The rest were transferred to other hospitals, 139 being sent to Colonial Hospitals, as it was the policy for Colonial troops to be treated as far as possible in their own hospitals. Thirty-six went to hospitals for special treatment. The remaining 165 were transferred to neighbouring hospitals when we closed down.

With regard to the cases transferred for special treatment there was a system in the Middle East for the collection of certain cases into special

hospitals for expert treatment. The intention was to have cases labelled in the field with special labels that were issued and sent direct to the appropriate hospital. This however did not appear to work out in practice and we had many cases with various of these special labels. No doubt it was found impossible to divide up cases on the ambulance trains. The centres were:—

(1) Chest: We only sent one case. Our cases were either open pyopneumothorax unfit to travel or simple hæmothorax requiring no special treatment.

(2) The Head Centre: We sent ten head wounds; the instructions were to send all cases within twenty-four hours if fit to travel.

(3) The Facio-Maxillary Centre: We sent three fractured jaws and one case requiring extensive plastic procedures.

(4) The Orthopædic Centre: We had cases that qualified for transfer to this and there was neither accommodation nor transport available. We sent eight peripheral nerve injuries and five knee cases requiring clean operation.

I have looked through the case records of the war wounds and though the number is very small a few points of interest arise.

(1) The records are not accurate enough to show the number injured by the various types of projectile but the vast majority were shell or bomb wounds.

(2) The number stated to have had operative treatment within twelve hours is four only; there may have been a few more not recorded accurately but the number in any case was small.

(3) There were wounds of the lower limb.

(4) Foreign bodies are recorded as having been removed in only 71 cases. The usual principle was adopted in our hospital of removing the foreign body only if found in the course of an operation for other reasons, if causing symptoms or if the foreign body was large and likely to give rise to trouble later and its removal apparently free from risk.

(5) Sulphonamide is recorded as having been used in 156 cases. It is possible that the records are incomplete and that the number should be greater but enquiries were always made as to the possibility of sulphonamide having been given and I think the figure is fairly accurate.

(6) Plaster of Paris was used at some period in the treatment of 117 cases of which 69 were wounds of the lower limb. That is to say that plaster was used in only 69 out of 125 wounds of the lower limb and of these 47 were fractures. Sixteen fractures of the lower limb were not treated by plaster. Only 22 cases of wounds of the lower limb without bone injury were treated in plaster out of a total of 83. Many of these wounds were of the through and through type or were small. But the plaster treatment apart from fractures is not so universal as one is led to believe. The figures for wounds of the arm were: in wounds of soft tissues, out of 34 cases 12 were treated by plaster; out of 44 fractures 34 were treated by plaster. It is not found practicable in many cases to leave the plaster unchanged for

long periods. Many of the wounds were grossly infected and the discharge profuse. Frequently we found that the patient became uncomfortable after three or four days and the plaster had to be changed. Our principle was to leave the plaster as long as possible but to change it at once if the limb became painful.

(7) There were two cases admitted with a note that gas gangrene had been present. One had had a below knee amputation and there appeared to have been definite gas gangrene of the foot. The second had had only localized gas in the tissues and did not show any signs of gas gangrene on admission to our hospital and was obviously not true gas gangrene. One case was admitted in poor condition with a gangrenous arm in plaster. There were multiple wounds of the arm with compound fracture of the humerus and gas gangrene of the forearm extending just above the elbow. Amputation was done on arrival at the base. We had a few cases which had gas in the tissues and from some the gas-forming organisms were isolated but they were not cases of spreading gas gangrene. There were, in fact, only two cases of true gas gangrene.

(8) One hundred and sixty-two cases are recorded as having had operations in our hospital and 440 operations were performed. The latter figure is accounted for by the fact that the changing of a plaster under an anæsthetic is recorded as an operation and also that some of the operations were upon the Colonial troops not included in these case records. Many of the severe cases required a number of operations. An example was a case of shell wounds of buttock and of the foot with injury to the os calcis. He required wound toilet, improvement of drainage, opening of abscesses, removal of sequestra, ligaturing of a vessel for secondary hæmorrhage and colostomy as well as the changing of the plaster on several occasions. He had before coming to us had excision of wounds and a suprapubic cystotomy. Many of the cases we transferred to special hospitals probably required operation. But more than half of our admissions required no operation at the base.

(9) The majority of our cases had been wounded upwards of six days, many as much as ten days, before admission. Most of the wounds were infected. All the large wounds were pouring pus. The through and through wounds caused by a bullet or small fragment of shell or bomb were often clean. We had for example six cases of penetration of the knee-joint which were uninfected and six cases of uninfected hæmothorax. We failed to note any difference on admission in the appearance of wounds treated by sulphonamide powder and those not so treated. Large wounds were invariably grossly infected and discharging profusely whatever treatment had been adopted. But very few of these cases had had surgical treatment within twelve or even twenty-four hours. Only a small number had been treated by primary suture. I actually saw only three and in all the treatment had failed completely, and there was a severe and spreading infection, and the sutures had to be removed and additional incisions made for drain-

age. Our standard treatment of these infected wounds was examination under anæsthetic, removal of dead tissue and any foreign bodies seen, and thorough drainage. We used vaseline gauze to assist drainage and as a dressing and, in suitable cases, a rubber tissue drain but avoided packing of wounds. Plaster of Paris was used whenever it seemed helpful. Whether or not plaster was applied re-dressing was avoided for as long as possible. Most of the wounds did well, healing much more quickly than one expected. Wounds of the buttocks, of which there were sixteen, did badly. The more severe were complicated by fractured pelvis and visceral injury and in any case the wound was liable to become contaminated by fæces. A colostomy was done with improvement in three cases of extensive wounds and it would seem worth doing more often.

(10) Secondary hæmorrhage was rather common. There were two cases from the femoral artery in amputation stumps, one case from the posterior tibial artery, two cases from the rectal vessels in buttock wounds, one from the inferior thyroid artery and seven from the brachial or axillary artery in wounds of the upper arm. This frequent occurrence in the arm may be associated with the greater difficulty in achieving satisfactory fixation of that limb.

(11) There were only twenty cases of burns nine of which were severe. The early treatment was not specified except in two cases where tannofax had been used. They were all in a septic condition on arrival and were treated by saline dressings or by flavine and paraffin with or without sulphonamide.

(12) We had only three cases of abdominal wound excluding rectal wounds. One multiple visceral wound did well though we left him with a large cæcal fistula. A second wound of the pelvic colon died of pneumonia. A third wound of the liver did well.

(13) Out of seventeen chest wounds five were cases of open pyo-pneumothorax and arrived in bad condition. Closed drainage was instituted and subsequently aspiration drainage by syphon. One died and four did well. These cases of open pyo-pneumothorax travelled very badly. Attempts to close the wounds by suture had failed owing to sepsis. It seemed that it would be desirable and not difficult to design a form of closed drainage which could be instituted in the C.C.S. and continued during the period of travelling to the base. The improvement in these cases when closed drainage was commenced was immediate and striking. Six cases of hæmothorax were treated by repeated aspiration and did well. The other six cases had wounds over the chest with physical signs in the lungs or a history of hæmoptysis. Three had clear sterile fluid aspirated. All did well. No case of infected pleura was seen other than those with a large open wound penetrating the pleural cavity.

(14) Six eyes were removed for small foreign bodies—perhaps some support for those who advocate protection by a vizor.

(15) There were seven amputations of arm and six of leg either done before admission or which became necessary in our hospital. All did well

except one thigh amputation which had been sutured in the field with inadequate drainage. He was very ill and required numerous counter-incisions and blood transfusion. Our experience agrees with the general belief that primary suture of war wounds should never be done.

(16) With regard to anæsthesia, pentothal was used either alone or in combination in 85 per cent of cases. It was most satisfactory and no ill-effects ever occurred. Pentothal plus gas and oxygen seemed the ideal anæsthetic for most cases, but we were only able to use gas when essential for the patient's safety as the supplies were short. We therefore used pentothal alone—in repeated doses if necessary—or pentothal plus ether in the majority of cases. Local anæsthesia was rarely suitable and spinal was not used in any wound cases.

This is a record of a very short period of activity and of a small number of cases but it does, I think, show what is expected of a General Hospital in these days and the type of surgery that one has to deal with at the base.

THE LABORATORY DIAGNOSIS OF DYSENTERY OCCURRING IN SOUTH AFRICAN TROOPS IN THE MIDDLE EAST.

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THE primary purpose of this communication is to outline the methods used in a South African Hospital Laboratory in the Middle East for the diagnosis of dysentery. These methods are based on D.M.S., M.E., Technical Instructions, 1941, No. 59, and on methods used by Colonel J. S. K. Boyd, and have proven very satisfactory in our hands.

Dysentery in the Middle East, as in South Africa, may be caused by helminthic, protozoal or bacterial infection.

(1) *Helminthic Dysentery*.—Our experience of this condition is limited to one case which was discovered in the course of a routine examination of fifty-five kitchen personnel for dysentery carriers. The patient, a native from the Tzaneen District of the Transvaal, was infected with *Schistosoma mansoni*. The large lateral spine eggs of the parasite were very numerous and were easily detected in the mucus in the stool under the low power objective.

In rare cases *S. hamatobium* has been known to cause dysenteric symptoms. Although seven cases of infection of the genito-urinary system with *S. hamatobium* were detected, no evidence of dysentery caused by this organism was obtained.

(2) *Protozoal Dysentery*. (a) *Amœbic Dysentery*.—Eleven cases of infection with *E. histolytica* were encountered. In all but one of these cases, the naked-eye appearance of the stools was similar and characteristic of amœbic dysentery. These stools consisted of semi-solid brown faecal matter with some blood and brown mucus. The stools were very foul smelling. The one exception was a stool from a case of double infection with *E. histolytica* and *B. dysenteriae* Shiga. This stool consisted of glairy mucus and blood and could best be likened to "sago with red-currant jelly." No difficulty was found identifying an *E. histolytica* infection microscopically. For microscopic examination, a portion of mucus from the stool was washed in warm saline and any area containing dark necrotic patches carefully examined under a cover glass sealed with vaseline. The absence of any definite cellular exudate such as is present in acute bacillary dysentery stool was an important feature. Whilst few polymorphs were seen, the number of mononuclears, macrophages and red cells varied in different specimens. In a few specimens Charcot-Leyden crystals were seen.

The one characteristic feature was the presence of actively motile amœbæ containing red cells. Generally, when *E. histolytica* were found, they were

numerous. Sometimes a specimen of mucus from a stool disclosed one amoeba. In such cases a second or third specimen often showed an area containing numerous active amoebæ.

Two important technical points were strictly observed. Firstly, all stools were brought to the laboratory in bed-pans within half an hour of the stool being passed. Secondly, a bottle of saline was kept constantly in the incubator, so that the mucus could be washed with warm saline immediately on arrival in the laboratory.

In three cases the presence of *E. histolytica* cysts was diagnosed. These cases had a previous history of *E. histolytica* infection. The examination for cysts was carried out by rubbing up a small portion of fæces in a watch glass with a 1 per cent solution of iodine and potassium iodide. A drop of this suspension was mounted in the usual manner and examined for the presence of cysts.

In diagnosing the presence of cysts no cell over 14 microns in diameter was considered and examination with the micrometer eyepiece was found extremely useful.

(b) *Flagellate Dysentery*.—Two cases of infection with *Giardia lamblia* were observed. In neither case was any blood or mucus noticed in the stool nor was there any evidence of cellular exudate. *Trichomonas hominis* and *Chilomastix mesnili* were frequently observed in stools and on occasion along with *E. histolytica*. None of these flagellates could be accused of causing a true dysenteric condition.

(3) *Bacillary Dysentery*.—This condition accounted for the majority of the dysentery stools examined. In many cases the condition was of a mild nature and amounted to a "diarrhoea" or what is known in the Cape as "Appelkoos siekte." The naked-eye appearance of the stools was characteristic. In these mild cases the stools were of large volume, watery and pale brown in colour. Small flakes of mucus were present but no microscopic blood was evident.

In the more severe conditions the stool consisted of blood and mucus. Few of our cases showed much microscopic blood. The presence of copious blood is usually an indication of Shiga infection. Only one case of *B. dysenteriae* Shiga infection was encountered.

In a few cases of more severe dysentery, the stools were watery, of a yellow brown colour, and contained flakes of mucopus and greenish shreds of mucus.

The microscopic appearance of the stools was extremely characteristic. In a high proportion of cases an immediate diagnosis of the condition was made from the microscopic examination and a report forwarded at once to the ward. In this way correct treatment was instituted at the earliest possible stage of the infection. A flake of mucus was selected from the stool and examined in saline under a cover glass. The outstanding feature of the microscopic appearance was the cellularity of the field. The number of red cells present varied with the mucus selected, e.g. a clear piece of

mucus showed few red cells, a blood-stained shred showed many. Apart from the red cells, at least 90 per cent of the remaining cells were pus cells. A small number of epithelial cells, macrophages and eosinophils was also present, but the characteristic picture was that of an acute inflammatory exudate and was a typical "bacillary exudate."

In more advanced cases the number of pus cells decreased, more mononuclear cells were seen and erythrocytes became fewer. This type of exudate was known as an "indefinite exudate" and was of no diagnostic value as an indication of bacillary dysentery in view of its resemblance to the exudate found in amoebic dysentery. Stools showing an "indefinite exudate" were, however, cultured and from a certain portion dysentery bacilli were isolated.

It is essential that absolutely fresh stool specimens should be submitted for examination if a high percentage of isolations is to be obtained. Instructions were, therefore, issued that all "diarrhoeic" stools should be submitted immediately to the laboratory in a bed-pan and that on no account should more than thirty minutes elapse between the passing of the stool and its arrival at the laboratory.

The presence of cresolic disinfectant in the bed-pans was found at one stage to inhibit bacterial growth. This was remedied by thorough washing of the pans in hot water and substituting chloride of lime for cresolic disinfectant.

Cultures were made on MacConkey's medium, which was preferred to litmus-lactose-taurocholate agar. A portion of mucus was fished from the stool and well washed in sterile saline to get rid of excess *B. coli*. It was then rubbed on the surface of the plate. The platinum loop was then flamed and the rubbed area touched with the loop, with which a second area of the plate was stroked. Frequently the loop was again flamed and the second stroked area touched with the loop and, from this inoculation, a third area stroked. It was found that with this technique one half of a 3½-inch MacConkey plate could be used for each stool, although it was preferable to use one plate for each stool. The need for washing mucus before plate inoculation cannot be over-emphasized. Unless this procedure was carried out, the isolation rate dropped almost to zero. The plate was incubated overnight at 37° C. The colonies of dysentery bacilli were usually easily recognized as non-lactose fermenting, small, translucent, delicate colonies with a regular outline. Occasionally wholly irregular colonies of *B. dysenteriae* Sonne were observed. On some plates the colonies were so numerous that it was possible to carry out a direct agglutination test. In the majority of cases selected colonies were picked off and inoculated on to a second MacConkey plate, using a method suggested by Captain Manifold, I.M.S.

In this method a MacConkey plate is divided up into thirty-six sections by cross ruling the glass with a grease pencil. One strip containing six sections is used for each sub-culture and one of six colonies from each

original MacConkey plate is inoculated on each section. Thus six colonies from each of six stools can be inoculated on one MacConkey plate. The plate is incubated overnight and non-lactose fermenting colonies can be clearly distinguished. Direct agglutination tests using group sera can be carried out and the type of organism readily identified. Confirmatory biochemical reactions using lactose, glucose and mannite peptone water can then be done using inoculations from the plate colonies.

The direct agglutination tests were carried out by making a thick suspension of the organisms in saline. Five drops of this suspension were placed on a glass slide. One drop each of Shiga, Schmitz, Sonne, Flexner 1 and Flexner 2 polyvalent anti-sera respectively was added and mixed with the drops of suspension. The slide was then rocked for a few minutes. Positive results, which were easily seen naked-eye, developed in about five minutes. The mixtures which did not agglutinate served as controls.

The "Flexner" polyvalent sera used were prepared against the following strains:—

Flexner 1— <i>B. dysenteriae</i>	...	...	...	...	Flexner 1
					2
					3
Flexner 2— <i>B. dysenteriae</i>	...	...	...	...	Flexner 4
					5
					6
					Boyd 1

Occasionally strains were isolated which did not agglutinate with any of the type sera although they conformed in morphology and biochemical reaction with organisms of the dysentery group. Such strains were further investigated by inoculating tubes of lactose and saccharose peptone water, sealing with paraffin wax and incubating for three weeks. Most strains fermented lactose before the end of this period. One strain investigated in this manner proved to be *B. dysenteriae* Sonne.

The following table summarizes the results of an investigation of 125 cases of dysentery by the methods outlined above:—

TABLE.

Number of suspected cases investigated	...	...	...	...	125
Number of stools examined	...	...	...	...	134
Number of cases in which "bacillary exudate" was present	...	...	...	...	38
Number of cases in which "indefinite exudate" was present	...	...	...	...	57
Number of cases in which no exudate was present	...	...	...	...	30
Number of cases infected with <i>B. dysenteriae</i> Shiga	...	...	...	...	1
Number of cases infected with <i>B. dysenteriae</i> Schmitz	...	...	...	...	4
Number of cases infected with <i>B. dysenteriae</i> Sonne	...	...	...	...	2
Number of cases infected with <i>B. dysenteriae</i> Flexner	...	...	...	...	42
Total number of dysentery strains isolated	...	...	...	...	49
Percentage of cases showing exudate from which dysentery strains were isolated	...	...	...	...	53 per cent
Number of cases showing "bacillary exudate" from which dysentery strains were isolated	...	...	...	...	32 or 84 per cent
Number of cases showing "indefinite exudate" from which dysentery strains were isolated	...	...	...	...	17 or 30 per cent

It will be noted that, although no special selective medium was used, the isolation rate from bacillary exudates was very satisfactory.

Carriers.—A routine examination of kitchen personnel was carried out in an attempt to detect enteric and dysentery carriers. Three stools from each member of the hospital kitchen staff were examined. Altogether fifty-five members of the staff were investigated. The majority of the stools were formed or semi-formed and were, therefore, useless for examination for the presence of dysentery organisms. A few "loose" stools were further investigated by the methods described and from two of these *B. dysenteriae* Flexner was isolated. Neither of these carriers, one a native and the other an Italian P.O.W., reported ill at any time or appeared to consider their stools to be in any way abnormal.

Chronic Dysentery.—In twelve cases of chronic dysentery on whom sigmoidoscopic examinations were carried out, the bowel appearance suggested a chronic bacillary infection. Scrapings of the bowel wall were placed in a small bottle containing 30 per cent glycerine in normal saline adjusted with phosphate buffer to pH8, and sent to the laboratory. MacConkey plates were inoculated immediately on arrival of the specimen at the laboratory. In some cases the MacConkey plates were inoculated directly at the bedside. Two strains of *B. dysenteriae* Flexner were isolated from scrapings left in glycerol-saline and one strain of the same organism was recovered from a plate made at the bedside.

DISCUSSION.

The methods used in the examination of 134 stools from 125 patients suspected of dysentery have been outlined above. It is claimed that these methods have proven very satisfactory in view of the results obtained. The criteria used in the diagnosis of amœbic dysentery, viz. (a) the presence of actively motile amœbæ and (b) the presence of erythrocytes in these amœbæ, led to the discovery of eleven cases of active amœbic dysentery or 9 per cent of the total number of cases investigated. This high proportion of amœbic dysentery is explained by the fact that the majority of the patients gave a previous history of amœbic dysentery contracted in the Union or in the East African Campaign.

Only three patients were found excreting *E. histolytica* cysts in the faeces. All these patients presented evidence of previous *E. histolytica* infection. It is very doubtful if amœbic cysts found in the stools of patients who have given no previous history of *E. histolytica* infection can be regarded as pathogenic. Many protozoologists are of the opinion that different races of *E. histolytica* exist, some of which are non-pathogenic to man. Thus Brumpt (quoted by Manson-Bahr, 1940), recognizes a "physiological species" morphologically indistinguishable from pathogenic *E. histolytica*.

The majority of cases of dysentery were bacillary, and organisms of the Flexner group formed the highest proportion of isolations. By carefully

washing flakes of mucus before inoculating plates of media, a high percentage of isolations was obtained in cases showing a "bacillary exudate." This isolation rate compared well with that reported by Anderson and Cruikshank (1941). These workers investigating an outbreak of Flexner dysentery and, using a specially selective medium for Flexner's bacillus, reported an isolation rate of 97 per cent from the stools of thirty-five patients examined during the second to the fourth day of the disease and 83 per cent isolation from the stools of eighteen patients examined during the fifth to the seventh day of the disease. As the majority of our patients arrived in hospital from the third to the seventh day of the disease, our isolation rate of 86 per cent from thirty-eight patients showing bacillary exudate may be considered satisfactory.

The isolation of *B. dysenteriae* Flexner from the stools of two members of the kitchen personnel in the course of a routine examination was of considerable interest. Both patients exhibited stools showing an "indefinite exudate." Neither appeared ill nor appeared to consider his stools abnormal. These cases were probably suffering from chronic dysentery and they were obviously not suitable for employment in the hospital kitchens. Sporadic cases of dysentery had occurred at intervals amongst the hospital staff. Although it was not possible to trace any direct relationship between these carriers and such cases as did occur it was noted that fewer cases of dysentery occurred amongst the hospital staff after the two carriers had been isolated and cured.

The case of *Schistosoma mansoni* infection detected in a South African native in the course of routine examination for carriers raises an interesting problem in public health. This native came from the Tzaneen district of the Transvaal and apparently *S. mansoni* infection of natives is not uncommon in this district. Just as *S. haematobium* infection has gradually spread down the East Coast of the Union, so may we expect *S. mansoni* infection to spread, if a suitable snail host becomes infected with this helminth. It would appear worth while, whilst this infection is comparatively localized as it is at present, to take strenuous measures in an attempt to stamp out *S. mansoni* infection in the Union.

SUMMARY.

(1) 125 cases of dysentery were investigated in a South African General Hospital in the Middle East. 38 cases showed a "bacillary exudate" diagnostic of bacillary dysentery. 57 cases showed an "indefinite exudate," whilst 30 cases showed no exudate.

(2) 11 of the cases examined, or 8·8 per cent, were found to be infected with *E. histolytica*.

(3) 3 cases were found to be passing *E. histolytica* cysts. These cases all showed evidence of previous *E. histolytica* infection.

(4) 32 of the 38 cases showing "bacillary exudate" yielded dysentery bacilli on culture.

(5) *B. dysenteriae* Flexner was isolated in the majority of cases. *B. dysenteriae* Shiga, Schmitz and Sonne were also encountered.

(6) A routine examination of 55 suspected carriers yielded two cultures of *B. dysenteriae* Flexner and in one case *S. mansoni* ova were identified.

(7) *B. dysenteriae* Flexner was isolated from three of twelve sigmoidoscope specimens submitted.

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ABNORMALITIES OF SLEEP.

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AMONG the stresses of war lack of sleep bulks large. In the more active phases it is almost universal and its possible effect on efficiency and morale needs no emphasizing. One remedy is obvious, though often difficult to apply. Others, however, might be considered, and in this connexion I have heard nothing of the use of benzedrine, though the Germans were rumoured to employ it as a stimulant for their troops. There seems to me to be a case for using it on limited personnel in special emergencies, for instance for medical staffs dealing with sudden rushes after battles or air-raids, and I have found it efficacious in enabling the last twelve hours of thirty-six hours continuous work to be passed without undue fatigue or loss of efficiency.

There is, however, another military aspect of sleep—the disciplinary. From time to time soldiers are the subject of disciplinary action for being asleep when they should have been awake. The necessity for knitting up the ravelled sleeve of care is regarded as inadequate justification by the authorities but it is the object of this article to point out that in some cases a medical defence is admissible.

Speculations on the subject of sleep have a decent background of antiquity. Shakespeare, Dr. Johnson and the inimitable Sir Thomas Browne have contributed as much as many a modern arm-chair theorist but, of recent years, a leavening of experimental and clinical fact has lightened the anecdotal dough which still envelopes the problem. There seem to me to be three findings of significance:—

(1) It has been many times shown, clinically in man and experimentally in animals, that lesions in the region of the grey matter of the anterior end of the Sylvian aqueduct, especially between the corpora mamillaria and the third nerve nucleus, are liable to give rise to hypersomnia [1, 2].

(2) Decerebration of an animal by transection of the brain-stem results in an encephalogram identical with that of normal sleep [3].

(3) Pavlov [4] has found that in dogs when a conditional reflex is established which involves a time interval between the application of the stimulus and the appropriate reaction the animals are liable to go off to sleep during this interval. He interprets this as indicating the spread of inhibition from a localized region of the brain to involve the whole of consciousness.

What construction can be put on these findings? With our limited knowledge any theory must be highly speculative but it is worth remarking that all three cases are consonant with an interruption of afferent impulses to the cortex. This is in keeping with the unstimulating circumstances in which sleep usually occurs and the legendary case of the lady who, through disease, had lost all her senses except the olfactory and only gave signs

of being awake when she smelt her food. The supposition takes no account of the element of fatigue, unless it be that fatigue decreases the sensitivity or permeability of the higher centres to afferent impulses, nor does it afford any explanation of the paroxysmal forms of sleep which are shortly to be discussed.

Hypersomnia.—This is a condition in which sleep is abnormally prolonged and from which it is more than ordinarily difficult to rouse the patient. Otherwise his state is the same as in normal sleep. The breathing is quiet and shallow, the pupils are contracted and react only sluggishly to light, the tendon reflexes are diminished or absent and the plantar reflexes may be extensor. It is usually due to a lesion in the region of the hypothalamus and this may occur in encephalitis lethargica, focal vascular lesions, meningo-vascular syphilis or intracranial tumour. The latter may give rise indirectly to hypothalamic disturbances by causing hydrocephalus. Head-injury and trypanosomiasis are also mentioned in the textbooks.

Narcolepsy.—This symptom is one in which the patient is afflicted with irresistible attacks of sleep. The attack may last from a few minutes to half an hour or more and it is identical with normal sleep in that the patient can be roused in the ordinary way. It often comes on in quiet circumstances such as might predispose to sleep but sometimes when the patient is on his feet or in other unexpected situation. Occasionally it is possible to shake off an attack by violent activity—but more often this is merely a postponement. The visitations may come many times a day and seriously interfere with work.

Cataplexy is a term applied to a condition in which for a few seconds, though he is perfectly conscious, the patient is unable to move a muscle of his body. If he is standing he may or may not fall to the ground. The attacks are normally initiated by an emotion of some kind, most often that of laughter but sometimes of triumph as in one of my cases, or of joy. Kinnier Wilson relates the story of a cataplectic who met in a crowded street an old friend whom he had not seen for years. As he stepped forward to greet him he was overcome with paralysis and was unable to move hand or foot while his friend disappeared for ever into the crowd without noticing him.

Various movements or tremors may occur during an attack and there may be somatic accompaniments such as precordial sensations, fluttering of the stomach, warmth and tingling all over, sweating, slow pulse and dry mouth. The deep reflexes are abolished and the plantars may be extensor.

Sleep Paralysis.—The literature is evasive about sleep paralysis and it is usually mentioned merely in passing. It occurs either when the patient is just going to sleep or just waking up. Without any severe imbalance or loss of consciousness, he finds he is unable to move hand or foot and, as one might expect, the experience is usually accompanied by a strong feeling of anxiety. The duration is a matter of seconds or minutes and a touch is sufficient to release him from his unpleasant predicament.

Hallucinatory States occur in sufferers from narcolepsy. They usually take place on falling asleep, being then termed "hypnagogic hallucinations," but may occur when the subject is apparently awake. They are elaborate, visual and highly terrifying at the time, though readily recognized for what they are in his normal state. They are obviously analogous with the night terrors of childhood in which the degree of consciousness and insight is very variable and of which a sense of helplessness or paralysis often forms a part. It is just as reasonable to regard as primary the access of emotion as to attribute this to a disturbance of consciousness or mobility. Indeed all the sleep disturbances I am mentioning seem to form a continuous series and to be in the same class as "normal" reactions such as being "helpless with laughter" or having nightmares or dropping off to sleep after a good dinner. In all there are changes in affective, motor and conscious processes though the emphasis may vary in the different conditions.

Somnambulism.—In this condition the patient is able to stand and walk and may show a considerable degree of integration with his environment even though partly asleep. It usually occurs in adolescents or children and is a neurotic manifestation.

Of the above conditions I need not further discuss hypersomnia or somnambulism, the former a symptom of organic, the latter of functional disease. However it is worth while saying a little more of the narcolepsy, cataplexy, sleep paralysis group. These three conditions may occur together or separately, sleep paralysis being most often an independent manifestation while narcolepsy and cataplexy commonly occur in the same patient; in fact Löwenfeld [6] suggested that an accompanying cataplexy was essential to the diagnosis of narcolepsy. Certainly cataplexy is the more obvious departure from the normal and in the soldier it would be a bold step to diagnose fits of falling asleep as narcolepsy without any other abnormal manifestation. When narcolepsy does occur alone it is said to be usually post-encephalitic.

In discussing the ætiology of the condition one must admit the evidence is somewhat anecdotal. Because a patient has once had a head injury it does not mean that his narcolepsy is due to trauma; because he is putting on weight it does not argue an underlying endocrine dysfunction. The various factors to be mentioned have merely occurred sufficiently frequently in case histories to be suspected of ætiological significance.

(1) Hereditary or familial incidence is rare. Kinnier Wilson mentions a case occurring in one only of a pair of monovular twins [5].

(2) Trauma is often mentioned in case histories.

(3) Endocrines: the onset of the condition is often accompanied by an increase in weight. Menstruation or pregnancy may increase the symptoms and hypothyroidism is not uncommon though in most cases the B.M.R. is normal [7].

(4) Epilepsy occasionally occurs in the same subject [8, 9, 10, 11, 12].

(5) Psychopathological: recently reported. One typical case is said to have been cured by psycho-analysis (Misstieglar).

(6) Local lesions: vascular, tumours, etc.

(7) Cryptogenic or unknown: as so often, the largest group.

It should perhaps be mentioned that in a few cases there seems to have been a peculiar relation between narcolepsy and epistaxis. In some cases the cessation of repeated epistaxis has been followed by narcolepsy; in others a severe epistaxis has coincided with the abrupt termination of the narcoleptic attacks. It would be idle to speculate on the exact significance of this observation but perhaps it is worth mentioning that a similar relationship sometimes occurs in migraine.

The prognosis in narcolepsy is uncertain. Attacks may continue for many years or clear up after a short time. It is said that the prognosis is best in post-encephalitic cases. With regard to treatment many remedies, varying from bromides to encephalography, have been advocated at one time or another, but it now seems established that we have two important weapons only, ephedrine and benzedrine, the latter probably the best. These of course treat only the symptoms, not the underlying cause, and must be continuously taken to avoid attacks. Individuals vary in the dosage they require. Ephedrine gr. $\frac{1}{2}$ to 1 t.d.s., benzedrine 5 to 15 mgm. in two or three doses, are probably average requirements. The latter should not be given after 3 p.m. if it is not to interfere with the night's sleep.

I have not been able to find much about sleep paralysis in the literature to which I have had access. Nowadays it seems to be regarded as a "pure" sleep disturbance which may occur in association with narcolepsy or separately. It is thought to represent a state in which consciousness is awake while the motor functions are still asleep. There must also be at least a dulling of the sensory element as a light touch is sufficient to disperse the condition. For what it is worth, one of my cases, in which the condition occurred in a patient who also exhibited epileptiform phenomena, suggests an association with epilepsy. On the other hand a colleague, free from all epileptic taint, has described to me two attacks which he has suffered during his life and I have also come across at least one other case showing a few isolated attacks. A condition approximating to sleep paralysis occurs in night-terrors in children and the common nightmare, consisting of being in a terrifying environment and yet unable to move, may be the same phenomenon on a slightly lower plane of consciousness.

Finally I should like to quote four illustrative cases, all of whom I saw within a few months at a Middle East hospital.

(1) An Australian Aircraftsman aged 20 came up to out-patients complaining that for two years he had been subject to irresistible attacks of sleep. He was worried that he would get into trouble if he was found asleep at work. There was no relevant family history. He had suffered from asthma at the age of 12 but this cleared up and he had had no trouble since. The attacks might come on any time of day but usually under restful conditions. He could sometimes postpone them by getting up and walking

about but they nearly always came on in the end. At the time I saw him he was having attacks every few days and might have two attacks in the day. During the same period he noticed that sometimes when he was laughing his muscles all "seemed to relax" and for a few seconds he was unable to move. There were no abnormal physical signs. He had been fully investigated in Melbourne at the onset of the attacks and I sent him into an Australian hospital where investigations were also negative. Ephedrine was entirely effective in his case and when I saw him again six weeks after discharge from hospital he was having no attacks at all.

(2) A Staff-Serjeant, aged 28, complained of overwhelming attacks of sleep for four years. There was nothing relevant in his family history; he had had pneumonia and appendicitis but never asthma or urticaria. Shortly before he began to have the attacks he had been hit on the back of the head by a cricket ball. He had been dazed, and though he did not lose consciousness, he discontinued play for the afternoon. At first the attacks only occurred every month or two but recently the tempo had increased until he was having one or two a day. He was an engineer in civil life and had often fallen asleep while writing a report, waking up to find the pencil scrawling across the page. The attacks usually came on under quiet conditions and had attracted sufficient notice for him to be threatened with dismissal. He had joined the Army partly in the hope that a more active life would improve his condition. The hope was not realized; the attacks had become more frequent. They tended to come on especially while he was riding as passenger in a truck. This particularly distressed him as the passenger was supposed to act as look-out for hostile aircraft and it ill-behoved a Staff-Serjeant to be found asleep at his post.

He was occasionally able to avert attacks by getting up and walking about. He had two other types of attacks. In one the attack began with drowsiness, then his head fell to the left, the left arm and side trembled and he was quite unable to move at all for two to three minutes. It always came on when he was sitting down and usually when he was tired; at home after a long day's work, in the Army usually after a long rough ride in a truck. It rapidly went off if his friends sat him forward. This type of attack had also occurred for four years, at first every month or so, recently about once a fortnight. The second type was usually associated with a feeling of triumph or satisfaction; after making a good joke, getting the best of an argument or when administering a rebuke. His whole body would suddenly "go all limp" for one or two seconds, though he rapidly recovered and had never fallen. These attacks were rarer than the other two.

He had had headaches for years, occurring about once a week in civil life, usually starting in the afternoon and relieved by sleep. They were unrelated to the attacks, were situated behind the eyes or in the vertex and were throbbing in type. There were no accompanying visual phenomena. The headaches had been worse since serving in the desert. He had vomited quite often in the last few months, always at night, perhaps two to three times in the night and sometimes for several nights running. Thereafter he might have no trouble for weeks. He was an intelligent, talkative, rather argumentative young man, revealing no abnormal physical signs on examination. His C.S.F. was normal, Kahn and W.R. negative and X-ray of skull showed no evidence of old fracture. He had no cataplectic attacks in hospital but had regular narcoleptic attacks, normally at about 1030 and 1830. The latter lasted a minute or two to half an hour and were quite unrelieved by benzedrine.

(3) A Serjeant, aged 37, complained of attacks of inability to move, occurring while falling asleep or waking up. One younger brother had fits

as a child and another brother had died of "something to do with his head." There was nothing relevant in his past history but it was of interest to note that for years he had had occasional attacks of violent palpitations of sudden onset. I never had an opportunity of seeing an attack but the story suggested they might be paroxysmal tachycardia. The present attacks had been occurring since 1930. They took place usually just as he was going to sleep or waking up and began with a roaring noise in his head, followed immediately by inability to move a muscle. If he had phlegm in his throat he was unable to cough it up. The paralysis lasted, he thought, a few minutes and was accompanied by considerable anxiety and conscious effort to move. Suddenly he would be able to move a limb and it seemed to him that his pent-up effort escaped with a shriek as he recovered normality. Actually no one in the ward ever heard him shout so this was probably imaginary. No particular factors appeared to precipitate the attacks, which at first were only occasional but recently had occurred as often as three in ten days. He also complained that, since 1939, he had had occasional "blackouts" while walking along or during conversation. In the latter case he would lose the thread of the discourse for a moment or two. These attacks occurred about once in three weeks. He was admitted to hospital where nothing abnormal was found in his central nervous system, except for absent ankle-jerks, and all investigations were negative. He had a number of attacks of sleep paralysis in the ward, from one of which he was roused by a light touch though this felt to him "like a sledgehammer." Treatment with luminal diminished their frequency and he was discharged to attend as an out-patient. He has been seen twice and has had two attacks suggestive of major epileptic fits. In this case the sleep paralysis would appear to be an epileptic phenomenon.

(4) An Aircraftsman in the R.A.F., aged 29, complained of attacks of paralysis for twelve months. His sister was of a nervous disposition and one brother had been invalided from the R.A.F. with nerves. He had been nervous as a child, "afraid to go down alleys by himself," but he had a good work record as a baker confectioner and cook. He had reached Standard 7 at school and had been "an average scholar." His previous medical history included three attacks of pneumonia, appendicectomy and mastoidectomy. He had always been tongue-tied. The attacks of paralysis were of a year's standing and had first come on two days after his ship was attacked in convoy by a German raider. His ship had been hit and he was one of a number of volunteers who had gone below and worked for about five hours to keep her from flooding. The attacks were of two types. The first might come on at any time, whether he was lying or sitting or walking. It began with loss of power in his left arm, followed rapidly by the same thing in his right and in the rest of his body. He would sink to the ground and, if he were holding a cigarette, was likely to burn his clothes or himself. His eyes would close but he was quite conscious and knew what was going on around him. The attacks lasted at first a few minutes only, later ten to fifteen minutes. They were unaccompanied by any symptoms referable to the autonomic system and he had never hurt himself though he said that he had had sometimes only just missed falling on a stove in the cookhouse. The attacks had occurred about three times a day before admission to hospital but had been much less frequent since. The second type of attack occurred when laughing or with any feeling of surprise, especially a pleasant one. His knees gave way and for a few seconds he sank to the ground, thereafter rapidly recovering himself. He stated also that when doing any monotonous job he tended to drop off to sleep for a few seconds though he could almost always abort

this by getting up and walking about. Since the war he had dreamt a lot and had frequent nightmares from which he often woke up wanting to shout but unable to. On going further into the history one or two other relevant facts were elicited. Before leaving home he had got "a girl into the family way" and was anxious to return to England to do the right thing by her. He had had a friend in the R.A.F. who had had similar attacks to the patient's first type, starting, however, with turning of the head, and this man had been invalided out of the Service. He had never come across anyone with attacks of the second type but he was a boxer and the peculiar sagging at the knees (which he vividly illustrated) was associated in his mind with the boxer's collapse when knocked out. He had had a certain amount of frequency of micturition, but no polydipsia and his weight had shown no marked deviation from normal. Although when I saw him he had been some weeks in hospital no M.O. had seen one of these attacks so that a decision had to be arrived at by study of the history and his mental make-up. No abnormal physical signs were elicited, except for a slight stammer, and the C.S.F. was normal. The more the patient was questioned the more well defined became his story and his behaviour when shown to a clinical meeting—"I suffer from three types of attacks, etc."—definitely stamped him as hysterical. We were unable to elicit any clue as to how the idea of the attacks related to emotion had originated in his mind but their nature and that of the first type seemed to be respectively conditioned by his knowledge of another case and his picture of how a boxer collapses when struck. I quote this case as a nice exercise in differential diagnosis but it seems generally agreed that a psychogenic aetiology is rare in cataplexy.

I hope I have said enough to suggest that cases in which disciplinary action is being taken for sleeping on duty should not be cursorily dismissed from the medical point of view but a careful history should be obtained with special reference to the possibility of accompanying cataplectic attacks. At the same time leading questions should be as far as possible avoided as they may be seized on with avidity by the hysteric or the sufferer from *pendulosis plumbi*.

I wish to thank Colonel H. G. Peake, late R.A.M.C., O.C. of a Middle East General Hospital, for permission to publish the first three cases and Major Craigie, O.C. of a Middle East Psychiatric Unit, for permission to publish the fourth. I am indebted to the Director of Medical Services in the Middle East for permission to publish the paper as a whole.

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Editorial.

PENICILLIN—THE EFFECTIVE BUT ELUSIVE.

IN October, 1941, we ventured to publish an Editorial on Fleming's remarkable discovery, penicillin; on how it was found, its anti-bacterial properties and the attempts that were then being made by the Oxford group of bacteriologists and biochemists to obtain it in sufficient quantity for the necessary clinical trials. There was also the question of its exploitation, if found as good as its promise, for the cure of septic processes in man.

Now, over a year later, we possess the results of the clinical trials by teams of experts—but the exploitation of the drug for general use still awaits the inception of a successful method of its production in sufficient quantity for the needs of a great remedy.

Let us deal first with the clinical trials. These we owe, so far as this country is concerned, very largely to the work of Professor H. W. Florey, F.R.S., and N. E. Florey (*Lancet*, March 27, p. 387) and to the investigations of A. H. Clark, L. Colebrook, T. Gibson and M. T. Thomson (*Lancet*, May 15, 1943, p. 605) on the effect of penicillin in the elimination of hæmolytic streptococci and on staphylococci from burns. "A reasonably stable impure salt of penicillin," says Professor Florey, "can be made. This substance is extremely soluble in water but is destroyed by boiling, by acids and alkalies, by certain heavy metals, by oxidizing agents and by enzymes produced by air and other bacteria."

It will be seen at once that here is no simple substance to be handled by the Toms, Dicks and Harrys of the medical profession. The least alteration of the pH of the solvent—and the remedy disappears! Nor can it, though readily absorbed from the small intestine, be just swallowed and trusted to do its work. The gastric secretion is sufficiently acid to destroy it and it must be passed through in acid-proof capsules if it is to reach the duodenum safely. As a matter of fact, the two cases treated by the oral method were not conspicuously successful and administration by the mouth has been abandoned for the time being. "Penicillin" the authors point out "is bacteriostatic and not bactericidal, at least in concentrations likely to be used therapeutically. Leucocytes will live and tissue cultures grow in the presence of a concentration many times greater than that necessary to produce bacteriostasis." To these great and obvious advantages in favour of a substance required for the treatment of very severe infections must be countered the fact "that penicillin is rapidly excreted by the kidneys in high concentration so that large doses must be given to maintain a bacteriostatic level in the blood." Florey and Florey have found the intramuscular route the best for this purpose, doses being given at three-hourly

intervals. "An endeavour has been made so to regulate the dose that the blood at all times contains at least enough penicillin to inhibit the growth of the infecting organisms." This varies from case to case. With these reservations the results of treatment have been little short of miraculous both in this country and in America. The Floreys report on fifteen very severe generally infected cases of sepsis and on 172 local lesions—infections of eye and mastoid process, chronic wound sinuses and miscellaneous local septic conditions. "In most cases staphylococci and streptococci were eliminated with subsequent healing."

W. E. Herrell, Dorothy H. Hickman and H. L. Williams in the *Proceedings of the Staff Meetings of the Mayo Clinic* of December 30, 1942, and W. E. Herrell in the same publication of March 10, 1943, give their results for a striking series of cases treated. They prefer "the continuous or nearly continuous intravenous administration of pyrogen-free penicillin" as the method of choice and report on ten cases, seven cases being instances of severe staphylococcal sepsis. "The absence of any toxic manifestations of penicillin" in these cases is recorded as "gratifying." They give half a dozen photographs of Case 5, a little girl of four years old, admitted to hospital after four days of illness. We should like to reproduce these but it would take too long to get permission from the publishers. It must therefore suffice to say, that it would be impossible to imagine anything more suggestive of a speedy and horrible death than the first two photographs or of prettier and more charming health than the two last. This is an example of the utter defeat of a massed *Staphylococcus aureus* infection which could not, we think, have been brought about by any other means. The Floreys speak of the same thing. "With two exceptions" they say "the staphylococcus cases were only referred to us because they were considered hopeless after other forms of treatment, including sulphanilamides, had been tried without effect." And yet all ten recovered. One case of streptococcal meningitis treated by Fleming himself at St. Mary's Hospital by the intrathecal injection of penicillin, the first instance of this form of introduction of the remedy, is briefly summarized and is reported as a complete success. We hope to be able to study this case, which appears to promise well for those instances of meningitis caused by organisms of a nature immune to the sulphonamides, more closely when it is published in detail. Both Herrell and his associates in the Mayo Clinic and the Floreys working in this country record cases of bacterial endocarditis treated without success by penicillin. "Here again" as Herrell says "is emphasized the fact that the problem of treating bacterial endocarditis is not one of obtaining an anti-bacterial agent effective against certain strains of the Gram-producing streptococci. The ineradicable focus in the heart valve, as always, seems to re-implant the pathogens into the circulating blood stream."

As for its local use, the results in the treatment of burns speak for themselves. "Hemolytic streptococci disappeared from 41 of the 54 wounds

(76 per cent) within three to five days from the first application of penicillin and did not re-appear after it was discontinued. . . .” “In five cases with multiple burned areas, one area was left untreated by penicillin in order to see whether the streptococci would persist while they disappeared from the penicillin-treated areas. In every case that result was observed.”

In the meantime the biochemists have been busy with penicillin. E. P. Abraham, E. Chain, W. Baker and R. Robinson (*Nature*, January 23, 1943) have already described a nitrogenous substance, penicillamine, apparently an amino-acid, obtained by the hydrolysis of penicillin, and W. H. Duffin and S. Smith (*Nature*, March 27, 1943) have isolated a crystalline product, penillic acid, which may, when investigated, prove of importance. We are greatly impressed with the very promising accounts of the cases so far treated and, though we must still bide our time in patience, we look forward confidently to further clinical trials with this extraordinary substance.

FOREIGN RELIEF AND REHABILITATION OPERATIONS, NORTH AFRICA.

Announcement of Appointments by Department of State, Washington.

(Communicated March 23, 1943.)

THE appointment of Dr. James A. Crabtree as Chief Medical Officer of the Office of Foreign Relief and Rehabilitation Operations was announced to-day by Mr. Herbert H. Lehman, the Director. Mr. Lehman also announced that three Public Health Service Medical Officers have been assigned by his Office to North Africa and will depart for the field as soon as transportation facilities are available. The three Public Health Service Officers are Drs. Dudley A. Reekie, Dorland J. Davis, and Michael L. Furcolow. Dr. Reekie is assigned as Chief Medical Adviser to Mr. Robert L. Murphy, Chief Civilian Affairs Officer on the staff of General Dwight E. Eisenhower.

Dr. Crabtree is assuming the post of Chief Medical Officer of the Office of Foreign Relief and Rehabilitation Operations on loan from the United States Public Health Service. For the past two years he has served as Secretary of the Health and Medical Committee of the Office of Defence Health and Welfare Services. Additionally, he has been the Medical Consultant of the Office of Lend-Lease Administration for the last six months, dealing with professional problems concerning drugs, hospital and medical supplies. A graduate of Johns Hopkins School of Hygiene and Public Health, he served in the Tennessee State Health Department in a number of capacities and was Deputy Medical Director of the Tennessee Valley Authority. He was appointed to the Public Health Service in 1937.

Mr. Lehman said that the dispatch of the three Public Health Officers into the North Africa field will strengthen the personnel of the Office of Foreign Relief and Rehabilitation Mission which has been in Algeria and

French Morocco since January. Under the direction of Mr. Fred K. Hoehler, Director of Relief for North Africa, the O.F.R.R.O. is making preparations for extension of relief to distressed civilian populations in Tunisia.

In announcing that Dr. Crabtree was becoming Chief Medical Officer of the Office of Foreign Relief and Rehabilitation Operations Mr. Lehman said:—

“ It is apparent that the control of epidemics is an integral part of the problems which confront the O.F.R.R.O. Hunger and disease will be two major facts in any populations freed from enemy domination. These two horsemen always follow in the wake of war.

“ The Office of Foreign Relief and Rehabilitation Operations has recognized from the outset the necessity of planning and executing an extensive medical and health programme in theatres of relief operations. Almost from the outset of our operations, the several Governmental agencies concerned with the various aspects of public health and medical care were asked to provide their assistance. A number of these agencies have been working on these problems in advance of the creation of the Office of Foreign Relief and Rehabilitation Operations.

“ Accordingly, I created an Advisory Committee on Health and Medical Care under the Chairmanship of Surgeon General Thomas Parran, U.S. Public Health Service, and asked the heads of a number of other Departments to assign representatives to sit on the Committee.

“ In establishing this Committee, I asked it to undertake the following work:—

- (1) “ To collect and analyse available information concerning disease prevalence and important health problems in areas which may be re-occupied by our armed forces.
- (2) “ To appraise the epidemic and other disease conditions which are likely to be an important part of relief and rehabilitation.
- (3) “ To estimate the amount and kinds of essential health and medical supplies and equipment which must be provided.
- (4) “ To consider—at least in general terms—the numbers, skill and potential sources of personnel needed to deal with epidemic and other health problems.
- (5) “ To consider, in conjunction with appropriate agricultural and other sources of information, the nutritional problems ahead.
- (6) “ To advise the Director of Foreign Relief and Rehabilitation upon request concerning other aspects of public health as the occasion requires.

“ In addition to the Chairman, Dr. Parran, the Committee now includes: Colonel James S. Simmons, U.S. Army; Commander T. J. Carter, U.S. Navy; Dr. Martha Eliot, Children's Bureau; Dr. Alfred Cohn, Board of Economic Warfare; Professor C.-E. A. Winslow, Yale University School of Medicine; Dr. Frank G. Boudreau, Director of the Milbank Memorial

Fund; Mr. Selskar Gunn, Vice-President of the Rockefeller Foundation, and Dr. Crabtree.

"The fullest co-operation has been extended to my Office by all members of this Committee, both representatives of Government agencies and non-governmental experts."

Dr. Boudreau formerly was Director of the Health Section of the League of Nations and was associated with the League for many years. Mr. Gunn was in charge of Rockefeller Foundation activities in Europe for many years, and later was in charge of the Foundation's activities in the Far East. He has spent twenty-three of the past twenty-five years in foreign public health work. The Rockefeller Foundation has loaned Mr. Gunn to the O.F.R.R.O. on a full-time basis as Secretary of the Advisory Committee. Dr. Winslow of Yale University participated actively in the work of a number of the Health Committees of the League of Nations.

In commenting on the preparatory work already accomplished by the Advisory Committee, Mr. Lehman said:—

"The War Department has not only assigned Colonel Simmons as its representative on the Advisory Committee but has also designated Colonel Ira V. Hiscock as Liaison Officer.

"For many months, the Lend-Lease Administration has been making an estimate of drugs and medical supplies which may be needed after the liberation of occupied countries. The full co-operation of the National Research Council has been available in this work.

"The Children's Bureau is contributing technical aid on child care and maternity problems. Through Dr. Boudreau, of the Food and Nutrition Board of the National Research Council, the best scientific advice has been available concerning nutrition problems.

"The American Red Cross is co-operating. Initial activities of the Office of Foreign Relief and Rehabilitation Operations in North Africa consisted of distribution of considerable supplies of powdered milk through child feeding stations, undertaken through the Red Cross. The Red Cross additionally has undertaken to supply certain laboratory and health supplies.

"It was apparent that much necessary information concerning public health problems in countries likely to be reoccupied already was available in various departments in Washington and in data compiled by the Rockefeller Foundation. This information has been assembled, digested and interpreted, country by country, during recent months.

"For many years the U.S. Public Health Service has assembled current reports on communicable diseases through the Offices of all American Consuls. The Advisory Committee on Health and Medical Care now has received this information, together with additional data available from the Army and Navy.

"In order to deal with special problems, a number of sub-committees have been appointed. These include the following:—

"Nutrition, under Chairmanship of Dr. Boudreau and including Dr.

Russell Wilder, Dr. W. H. Sebrell, Colonel Paul E. Howe, Mr. Harold A. Vogel.

"Sanitation of Environment, under Chairmanship of Dr. C.-E. A. Winslow, and including Mr. Abel Wolman, Colonel William A. Hardenbergh, and Senior Sanitary Engineer John J. Hoskins.

"Maternal and Child Health under Chairmanship of Dr. Martha Eliot, and including Dr. Henry F. Helmholz, Dr. Edwards A. Park, Dr. Nicholson J. Eastman, Dr. Clifford Grulee and Dr. Joseph Stokes.

"Tropical Diseases, under Chairmanship of Colonel Simmons with other members to be selected later."

Mr. Lehman said that Surgeon General Parran and members of his Committee have been in communication with a comparable group in Great Britain, which is organized under the Inter-Allied Post-War Requirements Committee.

"Uniform standard lists of essential drugs are being agreed upon and information is being exchanged between my Committee and the London group," Mr. Lehman said. "Dr. Melville MacKenzie, Chairman of the London group, has been invited to come to the United States for discussions. Dr. Raymond Gautier of Switzerland, who is associated with the League of Nations, also has been invited to come here for a conference concerning health matters.

"In the field of health, as in other sectors of the task of bringing relief and rehabilitation to the liberated peoples, it is apparent that there will be needed not only the full participation of Governments but also of all voluntary agencies and foundations experienced in this field. The task will be so tremendous that even the combined efforts of Government and private agencies will be unable to meet all the demands.

"The task of healing the wounds of war should engage the full efforts of all the United Nations and all freedom loving people everywhere. When our victorious United Nations' armies complete the liberation of the suffering peoples, it will no longer be a question of how much we contribute out of our largess to aid the starving and the sick, but rather how completely we are willing to share our limited joint resources to aid the sick and the starving."

Clinical and other Notes.

APPARATUS FOR MAKING PLASTER OF PARIS SLABS.

BY LIEUTENANT-COLONEL F. A. D'ABREU, CH.M., F.R.C.S.,

Royal Army Medical Corps.

Surgical Specialist to a C.C.S.

THE accompanying illustrations are of an apparatus made for me by Private J. S. Harrison, R.A.M.C., of this C.C.S., for easy and rapid making of plaster slabs. It is very simple and is perhaps in use already at other units. In all the hospitals and Casualty Clearing Stations to which I have been attached or have visited, however, the comparatively clumsy and

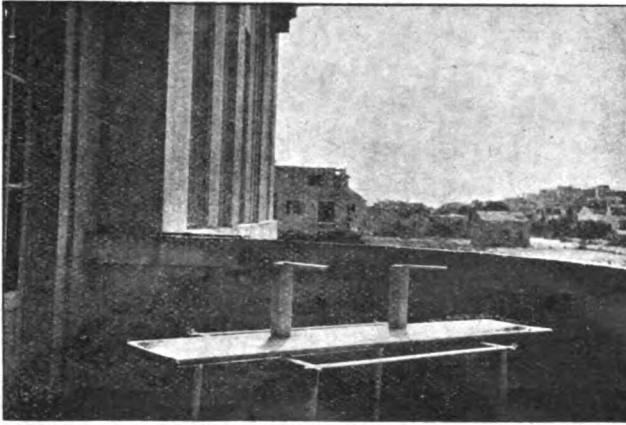


FIG. 1.



FIG. 2.

slow method of rolling out the plaster bandages on to a flat surface has been in use.

As fig. 1 shows, the requirements are merely a flat board about four by one and a half feet. To this are fixed two uprights, each holding a projecting bar. One of the uprights is fixed by a winged screw in a slot cut into the wooden board so that its position in the slot can be varied at will in order to make the required length slab by winding the wet plaster bandage around the projecting bars (fig. 2). When the slab is thick enough, it is pulled off the bars and smoothed flat on the board.

The time and trouble saved will be appreciated by those who use plaster of Paris extensively and have been preparing their slabs by the old method.

My thanks are due to Private Harrison for making the apparatus for me.

SOME ASPECTS OF THE MILITARY PROBLEM OF IMPETIGO CONTAGIOSA.

By MAJOR R. H. MUMFORD,

Royal Army Medical Corps.

INTRODUCTION.

IMPETIGO, one of the nuisance diseases, is peculiarly troublesome to an Army in war time, whether it affects soldiers who are in training or mobilizing or operational. Its contagiousness renders it essential to treat cases in a medical institution but it is not always that beds are available locally unless Camp Reception or Reception Stations are prepared (and permitted) to accept cases. As the regulations regarding Reception Stations do not allow any case to be detained for more than ten days the M.O. in charge must endeavour to intensify treatment to such an extent that cases, if not actually cured on the tenth day, have at least reached such a stage of healing as to be no longer infective and not likely to flare up from reinfection on return to unit.

The writer is not a dermatologist. This intrusion into the field of a speciality is made because experiences gained in treating some scores of cases in Camp Reception Stations during the past months have suggested some promising lines of action which, it is believed, are not generally known or accepted.

SPREAD.

The resistance of some lesions to recognized therapy, such as mercurial applications, the dyes, silver nitrate or sulphonamide (local and/or oral), indicates that there may be a constant replenishment of bacteria which counteracts the efforts of the medical officer. That such a focus is usually exogenous is evident from the fact that lesions protected by bandages are less prone to chronicity. The lobes of the ears, sides of the face and the chin are most frequently found to provide the sites of this type of lesion and it is just these areas of distribution that come into closest contact with

the bed-covering when most of us "snuggle down" in bed, especially in cold weather when the bed-clothes are wrapped in closest proximity to the skin. I have demonstrated with a hand lens blanket hairs in an ulcer.

If these facts are accepted, it is logical that septic sores should be protected by bandages—including those cases treated as out-patients—and that cases arriving at a Hospital or C.R.S. for admission should (as is routine for scabies and vermin infestation) bring their blankets for fumigation.

THERAPY.

Generally speaking it has been our experience that the most difficult cases are those that have been under treatment, prior to admission, with ung. hydrarg. ammon.

Mercury dermatitis and devitalized tissues are formidable handicaps and some cases have been transferred immediately to an E.M.S. or Military Hospital as it has been obvious that no quick cure could be anticipated.

Dermatologists agree that ung. hydrarg. ammon. should not be stronger than $2\frac{1}{2}$ per cent when used in the treatment of impetigo. Unless an indent specifies that "dil" is intended, the issue will presumably be that of the B.P. 5 per cent preparation. During the 1914-18 War, a 1 per cent preparation of amm. hydrarg. in zinc was found efficacious. ("Medical History of the War," 1923) [1]. As Regimental M.O.s seldom, if ever, require the stronger preparation, it would be advisable to make the ung. hydrarg. amm. dil. the routine issue. It has been a shock to find that in the O.P. departments of some hospitals, patients with impetigo have been given a box of ointment with the instructions that they should return in a week, i.e. on the visiting dermatologist's "day." We have seen some of the unsightly messes that have resulted from this week's self-treatment, especially "sick-on-leave" cases. Every case of impetigo should be inspected daily by a medical practitioner. There is, we believe, no routine treatment that can be guaranteed to produce good results in every case. Each case should be treated, not only on its own merits but on its own daily merit. It is the careful daily study that enables the most effective timing of the exhibition of the medical officer's "ammunition," whether it be boric starch poulticing, sulphonamide intervention or chemical cauterization in addition to, or instead of, dye and other antiseptics. A prescription that has proved particularly useful in those cases which have not been treated with a mercury preparation is brilliant green and hydrarg. perchlor, each 0.5 per cent in spirit.

CAUSTIC THERAPY.

In view of the urgency of the time factor, which is one of the chief "headaches" of Reception Station M.O.s, it was inevitable that the potentialities of chemical caustics, as advocated by Downie [2], should be explored. Apart from the more obvious limitations of the use of the silver nitrate stick, there was one disadvantage peculiar perhaps to a Reception Station, namely, retarded healing owing to devitalization of the ulcer area.

It is admitted that this would not be of any great importance where after-treatment can be safeguarded but our experience has shown that in some units it is risky to return cases whose ulcers, although clean, are as yet unhealed. When dealing with cases it is not only necessary to try to assess the mentality and habits of physical cleanliness of the individual soldier but also to note which units provide the higher proportion of "dirty" diseases such as scabies, vermin infestation and impetigo. The rate of recurrences give a useful index.

It occurred to the writer that by using blue stone—the actual crystals—instead of silver nitrate, the benefits of the latter without the disadvantage indicated might be attained. The technique at present used is as follows:

After the removal of crusts by oil or boric-starch poultices each ulcer is mopped clear of exudate and surrounded by a ring of ung. brilliant green which is applied thickly as a skin protective and trap for stray bacteria. The ulcer area may now be sprayed with ethyl chloride but, unless the patient is sensitive, this is not necessary. The blue stone is then rubbed lightly over the ulcer. Before covering with a light bandage, some of the heaped ung. brilliant green is spread over the cauterized area. The employment of an emollient and bandage thus reduces the degree of irritation and any scratching is rendered harmless.

This method is at present under trial. The results, so far, are consistently promising but the clinical material is scanty. It seems, therefore, justifiable to place on record these observations in the hope that others better qualified to do so, and who have wider and unrestricted opportunities, may assess the value of the suggestions made.

ILLUSTRATIVE CASES.

While these notes stress the use of blue stone, this caustic has only been used as one of a number of measures and not as a panacea for all stages and all cases.

Case 1.—C.R.S. No. 737. Mixed infection, scattered lesions on face. Three and a half weeks' treatment, mostly at unit before blue stone therapy at C.R.S. Ulcers on chin, which had persisted in spite of routine treatment, immediately dried up and patient was discharged cured on fifth day.

Case 2.—C.R.S. No. 745. Similar to above; also three and a half weeks' other treatment. Discharged fifth day after application of blue stone.

Case 3.—C.R.S. No. 781. Scabby moist eruptions on left auricle and forehead. Had had two weeks' ineffective treatment by Regimental M.O.s. New crops suggested active streptococcal infection so patient was given 4 grams sulphonamide on day that blue stone was applied to the ulcers. The tablets were continued for four days. On day following application of blue stone ulcers showed great improvement and by the fourth morning only a few dried-up scabs remained. The patient was detained for two more days for observation and was then discharged "well."

Case 4.—C.R.S. No. 823. Admitted with large dirty ulcer on occiput and a few scattered streptococcal-like spots on neck. One week's history of ulcer. Blue stone applied immediately to large ulcer. Gentian violet painted on smaller lesions. Sulphonamide 4 grams daily for four days given

orally. A clean looking thin dry scab formed over the ulcer immediately and as this gradually separated healed skin was revealed. The patient was fit for discharge on tenth day but detained for another forty-eight hours for observation.

Case 5.—C.R.S. No. 849. Admitted after what unit M.O. described as "six weeks' ineffective treatment with sulphonamide powder." When seen at C.R.S. dirty scabby moist ulcers of ear lobes, sides of face and chin. Starch-boric poultices were first applied and blue stone treatment was given on third day. The lesions immediately dried up with the exception of a small patch on one ear and sores at the corners of the mouth. These mouth sores had not been treated with blue stone on account of position. On eighth day all cauterized lesions were clean and healed skin appeared as the scabs separated. The patient was detained until the thirteenth day in order to allow mouth sores to heal.

Case 6.—C.R.S. No. 867. Scabby dirty ulcers on the chin. Three weeks' history. Starch-boric poultice applied on admission and blue stone treatment given next day. Patient appeared to be cured on fourth day but I decided to detain for observation. Removal of part of a scab showed healthy granulations. Scabs then allowed to separate naturally and on the eighth day normal skin had replaced all ulcers, leaving no trace in way of scabs or scars.

SUMMARY.

- (1) The administrative advantages of short-term treatment is discussed.
- (2) The suggestion is made that all blankets, etc., of impetigo cases should be disinfected as a routine, as is done for scabies and vermin infestation.
- (3) The harm done by unskilled use of ung. hydrarg. ammon. is stressed.
- (4) The question of chemical caustics is discussed.
- (5) A special technique, involving the use of blue stone, is described with illustrative cases.

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- [1] "Official History of the War. Medical Services." Diseases of the War, Vol. II.
- [2] DOWNIE. *Journ. Roy. Army Med. Corps*, 1941, August.

Reviews.

MEDICAL DISEASES OF WAR. By Sir Arthur Hurst, M.A., D.M.Oxon, F.R.C.P. London: Edward Arnold & Co. 1943. Pp. viii + 495. Price 21s.

Interest in War Medicine continues to occupy the minds of physicians and this book meets the need of a compact reference work for medical officers.

As before, a large part of the book is devoted to a detailed consideration of the War Neuroses. Valuable new additions include sections on Typhus Fever, Diphtheria, Infective Hepatitis and the Sulphaguanidine Treatment of Bacillary Dysentery.

In the tropical field there is a useful chapter on Malaria. However, the treatment described for this disease should be brought into line with the standard method. For example, in malignant tertian malaria, quinine

bihydrochloride in a daily dose of twenty grains for two days is insufficient to alleviate symptoms and reduce the patient's temperature to normal before commencing treatment with mepacrine hydrochloride. It is suggested that British Pharmacopœial names for antimalarial drugs might be used with advantage in the text instead of their original German equivalents.

Sir Arthur Hurst is to be congratulated on this new edition of his book, the third since the outbreak of war. W. R. M. D.

(CARSON'S) MODERN OPERATIVE SURGERY. Vol. I. Third Edition. Edited by G. Grey Turner, D.Ch., LL.D., M.S., F.R.C.S., F.A.C.S. (Hon.). London: Cassell & Co., Ltd. 1943. Pp. xvi + 1041. Price 50s.

A third edition of this well-established system of operative surgery is fully justified by the popularity of its predecessors.

The first volume here under consideration has been brought up to date in all sections under the able editorship of Professor Grey Turner. The revision has in general been carried out by the original authors. Four new contributors, however, are announced but their articles do not appear in this volume. Eleven authors contribute to this volume and each presents an individual point of view of his subject.

The sections on thoracic and abdominal surgery are well illustrated and perhaps are the outstanding features of this first volume. The complete work should prove an invaluable book of reference to any operating surgeon.

C. M. P.

UROLOGY IN WAR WOUNDS AND OTHER EMERGENCIES OF THE GENITO-URINARY ORGANS, SURGICAL AND MEDICAL. By Charles Y. Bidgood. Lieutenant-Commander (M.C.), U.S.N.R. London: Baillière, Tindall and Cox. 1942. Pp. ix + 78. 27 illus. Price 11s.

This compact and well-illustrated volume of 78 pages contains an outline of the practical measures called for in the treatment of injuries and acute conditions of the genito-urinary apparatus. The advice given is based on orthodox lines. Eighteen pages are devoted to the consideration of anaesthesia for urology.

The schematic form of the monograph will hardly appeal to the mature surgeon but it will afford practical help to the isolated medical officer in a subject which has tended in peacetime to become the province of the specialist.

It is perhaps open to discussion how far it is useful in writings on war surgery to pigeonhole knowledge of special organs in separate volumes. The missile contacting the human frame does not show a similar convenient and well-controlled selectivity. C. M. P.

ERRATUM.

A SIMPLE FORM OF DRESSINGS DESTRUCTOR.

Vol. lxxx, No. 4, April, 1943. Seventh line from bottom of page 212 for "omitted" substitute "emitted".

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in duplicate through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

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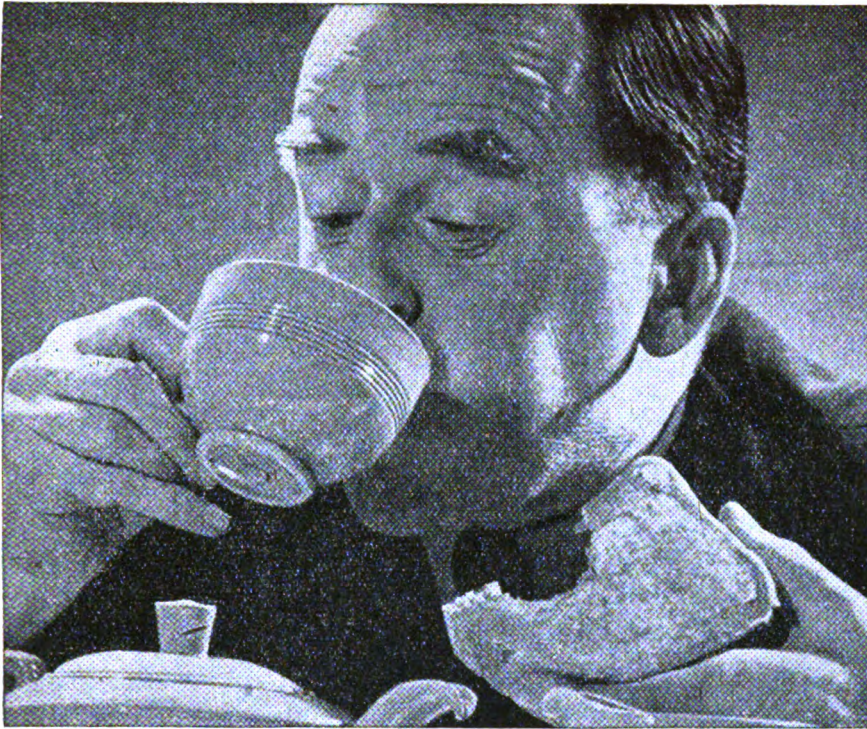
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JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS

Corps News.

JUNE, 1943.

EXTRACTS FROM THE "LONDON GAZETTE."

June 2, 1943.—The KING has been graciously pleased, on the occasion of the Celebration of His Majesty's Birthday, to give orders for the following promotions in, and appointments to, the Most Honourable Order of the Bath:—

To be Additional Members of the Military Division of the Second Class, or Knights Commanders, of the said Most Honourable Order:—

Lt.-Gen. Alexander Hood, *C.B., C.B.E., M.D., K.H.P.* (18164), late Royal Army Medical Corps.

Lt.-Gen. (acting) Ronald Morce Weeks, *C.B.E., D.S.O., M.C., T.D.* (51084), Territorial Army.

To be Additional Member of the Military Division of the Third Class, or Companion, of the said Most Honourable Order:—

Maj.-Gen. Oswald William McSheehy, *D.S.O., O.B.E., M.B., K.H.S.* (15664), late Royal Army Medical Corps.

The KING has been graciously pleased, on the occasion of the Celebration of His Majesty's Birthday, to give orders for the following promotions in, and appointments to, the Most Eminent Order of the Indian Empire:

To be Additional Companions of the said Most Excellent Order:—

Col. (temp. Brigadier) Henry Charles Deans Rankin, *O.B.E., M.B., V.H.S.*, Royal Army Medical Corps, Deputy Director of Medical Services, General Headquarters, India.

The KING has been graciously pleased, on the occasion of the Celebration of His Majesty's Birthday, to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire:

To be Additional Commander of the Military Division of the said Most Excellent Order:—

Lt.-Col. (temp. Brigadier) William Ernest Tyndall, *M.C., M.B., D.P.H.* (24193), Royal Army Medical Corps.

To be Additional Officers of the Military Division of the said Most Excellent Order:—

Lt.-Col., George James Alexander, *M.C., M.B., F.R.C.S.* (123120), Royal Army Medical Corps.

Major (temp. Lt.-Col.) Frederick Knowles Escritt (26278), Royal Army Medical Corps.

Chief Principal Matron Louisa Jane, Mrs. Wilkinson, *R.R.C.* (206505), Queen Alexandra's Imperial Military Nursing Service.

To be Additional Members of the Military Division of the said Most Excellent Order:—

Capt. Clive Ormsby Barnes, *M.B.* (97067), Royal Army Medical Corps.

Major (Qmr.) Frank John Hammond (58390), Royal Army Medical Corps.

Capt. Ronald Edscer Johnson (135652), Royal Army Medical Corps.

Major (Qmr.) Herbert Mark Prince (56852), Royal Army Medical Corps.

Capt. (temp. Major) (Qmr.) Phillip Arthur Percival Webberley (99201), Royal Army Medical Corps.

The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Royal Red Cross:—

Bar to the Royal Red Cross, First Class.

Miss Susannah Frances Davies, *R.R.C., Matron* (206648), Queen Alexandra's Imperial Military Nursing Service.

Miss Dinah Jessie MacGregor, *R.R.C., Matron* (206650), Queen Alexandra's Imperial Military Nursing Service.

*To be Members of the Royal Red Cross,
First Class.*

Q.A.I.M.N.S.

- Miss Helen Mary Adams, Sister (acting Matron) (206007).
Miss Helen Shiels Gillespie, Sister (acting Matron) (206162).
Miss Lilian Mary Hunnings, Sister (206197).
Miss Dorothy Nicholson, Sister (acting Matron) (206349).
Miss Janet Sybil Mary Pollock, Sister (acting Matron) (206377).
Miss Margaret Russell, Matron (206403).
Miss Norah Kathleen Smyth, Sister (acting Matron) (206435).

Q.A.I.M.N.S. Res.

- Miss Dorothy Jane Cooper, Sister (206067).

To be Associates of the Royal Red Cross, Second Class.

Q.A.I.M.N.S.

- Miss Florence Barbara Cozens, Sister (acting Matron) (206096).
Mrs. Irene Patricia Entwistle, Sister (acting Matron) (206317).

Q.A.I.M.N.S. Res.

- Miss Helen Crerar, Sister (206852).
Miss Margaret Annie Violet Mary De Gruchy, Sister (206926).
Miss Margaret Smart Hamilton, Sister (208443).
Miss Sarah Lambe Irving, Sister (208514).
Miss Madge Evelyn Jagged, Sister (208515).
Miss Rhoda Jekyll, Sister (acting Matron) (208516).

June 1.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the Middle East:—

The Distinguished Service Order.

- Capt. Antony Robert Phillips Ellis (104031), Royal Army Medical Corps (Sandy, Beds).

The Military Cross

- Capt. John Hilary Dorman (112389), Royal Army Medical Corps (Stafford).
Capt. William Gerald Edwards (183221), Royal Army Medical Corps (Ammanford, S.Wales).

The Military Medal.

- No. 7375378 L/Cpl. Douglas Alfred Brooks, Royal Army Medical Corps (Portsmouth).

No. 7365389 Pte. William Ledger, Royal Army Medical Corps (Dunston-on-Tyne).

May 18.—Lt.-Col. W. Frier, M.B. (15670), from R.A.M.C., to be Col., March 25, 1943, with seniority April 1, 1940. (Substituted for notification in Gazette (Supplement) dated May 11, 1943.)

May 25.—The undermentioned War Subs. Lt.-Cols. (temp. Cols.) (Maj.-Gens. local) to be Maj.-Gens., acting, May 5, 1943:—

- A. W. Stott, F.R.C.P. (106008).
C. M. Page, D.S.O., M.B., F.R.C.S., (51065).

Memoranda.

Lt.-Col. (temp. Col.) (local Brig.) W. H. Ogilvie, M.D., F.R.C.S. (131569), R.A.M.C., to be local Maj.-Gen., May 5, 1943.

May 28.—Lt.-Col. R. A. Flood, M.C., M.B. (4862), at his own request, reverts to the rank of Lt.-Col. whilst so employed, May 8, 1943.

June 1.—The undermentioned Capt. to be Majors:—

- C. King, M.B. (55948), April 28, 1943.
T/Major J. C. Reed, M.B. (56276), May 2, 1943.
T/Major P. O'Shea, M.B. (56058), May 4, 1943.

June 4.—Col. (temp. Brig.) W. C. Hartgill, O.B.E., M.C. (8648), late R.A.M.C., is granted the local rank of Maj.-Gen., May 20, 1943.

Major (temp. Lt.-Col.) G. G. Drummond (20289) to be Lt.-Col., June 6, 1943.

June 8.—Lt.-Col. (temp. Col.) C. M. Forster (10764) having reached the age for retirement is retained on the Active List supern. to estab., June 6, 1943.

June 11.—Major (acting Lt.-Col.) E. V. Whitby, M.B. (18165) is restd. to the rank of Lt.-Col., Nov. 27, 1942.

Regular Army Reserve of Officers.

General List.

May 18.—Col. B. Johnson, D.S.O., M.B. (9217), late R.A.M.C., having attained the age limit of liability to recall ceases to belong to the Res. of Offrs., May 19, 1943.

Lt.-Col. (acting Col.) L. Murphy, D.S.O. (11089), R.A.M.C., to be restd. to the rank of Col., April 19, 1943.

June 8.—Lt.-Col. (acting Col.) R. E. U. Newman, O.B.E., M.C., M.B. (10490), R.A.M.C., is restd. to the rank of Col., May 4, 1943.

TERRITORIAL ARMY.

May 28.—Lt.-Col. A. MacG. Duff, *M.C.*, *T.D.*, *M.B.* (35439), relinquishes his commission on account of ill-health. May 27, 1943, and is granted the hon. rank of Col.

June 8.—The KING has been graciously pleased to confer "The Efficiency Decoration" upon the following officers of the Territorial Army:—

Col. W. R. Ward (late *R.A.M.C.*, *T.A.*) (37887).

Royal Army Medical Corps.

Lt.-Col. (acting Brig.) G. J. V. Crosby (39045).

Lt.-Col. (temp. Col.) J. H. Donnelly (35778).

Lt.-Col. (temp. Col.) D. Mackie, *M.C.* (25954).

Lt.-Col. (temp. Col.) R. Rutherford (38840).

Major (temp. Lt.-Col.) R. O. Brooks (28771).

Major (temp. Lt.-Col.) M. S. Good (35527).

Major (temp. Lt.-Col.) G. L. Montgomery (41390).

Major (temp. Lt.-Col.) E. A. L. Murphy (35460).

Major (temp. Lt.-Col.) R. S. Taylor (39919).

Major (temp. Lt.-Col.) J. M. F. Whitby (7753).

Major P. Hayes (34691).

Major F. J. L. Lang (37420).

Major R. Pollok (40450).

Major R. V. Powell (47827).

Capt. (Qmr.) H. F. Wookey (T.A.R.O.) (51555).

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PRISONERS OF WAR.

A/Major G. L. Ellis. Malaya.

T/Major M. T. Read. Malaya.

T/Major W. M. Stewart. Malaya.

Capt. G. A. Anderson, N.E.I.

DEATHS.

EASTWOOD.—Colonel W. J. Eastwood died May 1, 1943. *M.E.*

BARNES.—Lieutenant G. F. Barnes, killed in action, May 4, 1943. *N.A.*

MACDONALD.—Killed in action in Tunisia on May 9, 1943. Major Angus Macdonald, *R.A.M.C.* Born June 28, 1905, he graduated *M.B.*, Edinburgh, in 1930. Commissioned Lieutenant *R.A.M.C.*, Oct. 1, 1930, he was promoted Captain April 1, 1934, and Major Oct. 1, 1940. He served in France 1939-40, and in Persia as well as Tunisia afterwards.

WILLIAM.—Captain W. R. Cyrcles William, killed in action, May 14, 1943. *N.A.*

SECCOMBE.—On May 25, 1943, Major John William Smyth Seccombe, *O.B.E.*, *R.A.M.C.* Eldest son of the late Paymaster Captain J. W. Seccombe, *R.N.*, he was born Nov. 21, 1876. Educated at St. George's Hospital he took the *L.R.C.P.* and *M.R.C.S.* in 1901 and the *D.P.H.* in 1906. Having been House Physician at St. George's Hospital and House Surgeon at the Radcliffe Infirmary, Oxford, he was commissioned Lieutenant, *R.A.M.C.*,

Sept. 1, 1902. He was promoted Captain March 1, 1906, Major Sept. 1, 1914, and retired Sept. 12, 1923. He was placed on half pay for a time towards the end of 1922 on account of ill-health. He served in Macedonia in 1916 and with the Egyptian Expeditionary Force from Aug., 1917, till the end of the war, being mentioned in despatches and awarded the *O.B.E.*, British War and Victory Medals.

ROWAN-ROBINSON.—On June 11, 1943, Major Frederick England Rowan-Robinson, *M.B.*, *R.A.M.C.*, Retired. Born March 23, 1878, he graduated *M.B.*, Edinburgh, in 1900, and entered the *R.A.M.C.* Jan. 29, 1901. Promoted Captain Jan. 29, 1904, and Major Oct. 29, 1912, after a month on half pay, on account of ill-health, he retired Nov. 25, 1922. He took part in the operations in the Orange River Colony and Cape Colony in 1901 and 1902. He again saw service in the Aden operations in the interior in 1904. He served in France and Belgium from June, 1916, till Dec., 1919, being mentioned in despatches. He changed his name by Deed Poll Jan. 17, 1905, from Robinson.

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of the
Royal Army Medical Corps

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OF THE

Royal Army Medical Corps

EDITED BY

COLONEL S. LYLE CUMMINS, *C.B.*, *C.M.G.*

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OF THE

Royal Army Medical Corps

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MONTHLY

EDITOR.

COLONEL S. LYLE CUMMINS, C.B., C.M.G.

ASSISTANT EDITOR.

LIEUTENANT-COLONEL A. E. CAMPBELL, R.A.M.C.

MANAGER.

LIEUTENANT-COLONEL C. A. WHITFIELD, R.A.M.C.

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MESSAGE FROM HER MAJESTY THE QUEEN,
COLONEL-IN-CHIEF, ROYAL ARMY MEDICAL CORPS.

THE Director-General, Army Medical Services, who sent the telegram given below to our Colonel-in-Chief, has received the following gracious message from Her Majesty The Queen.

The Director-General,
Army Medical Services.

My sincere thanks to all ranks for their loyal message on my birthday, which I have received with much pleasure.

ELIZABETH R., Colonel-in-Chief,
Buckingham Palace.

The Private Secretary to Her Majesty The Queen,
Buckingham Palace.

Colonels Commandant and all ranks, Royal Army Medical Corps, submit their most respectful greetings to their Colonel-in-Chief on her birthday.

The Director-General,
Army Medical Services.

R

Authors are alone responsible for the statements
made and the opinions expressed in their papers.

Journal of the Royal Army Medical Corps.

Original Communications.

A CASE SHOWING UNUSUAL EFFECTS OF TRAUMA.

BY MAJOR J. V. WILSON,
Royal Army Medical Corps.

THE following case is reported as being of interest on account of the multiplicity and nature of the internal injuries resulting from trauma without at the same time any extensive external injury.

Medical History.—The patient was a naval rating aged 21 years and gave no previous history of injury. There was no previous illness of note. When on patrol, his ship struck a mine and he received a superficial wound about $\frac{3}{4}$ inch long on the forehead just above the root of the nose caused by a small splinter from the mine. There was no definite statement that he either fell or was thrown against the ship's structures on this occasion and the only visible injury he received was the one on the forehead. There was no evidence of cranial injury and after examination by the medical officer he was allowed full liberty on his ship and was doing light duty.

Two days later at 1320 hours he was swinging across a hold on a chain which gave way and he fell down the hatch from the Sick Bay flat to the stokers' mess deck, striking the back of his head. The hatch consisted of two flights of steps at an angle to each other, the total distance between the decks being about 10 feet. This fall was broken at the end of the first flight and from thence he more or less rolled downward to the deck below. Examination immediately after this second accident showed that there was a fairly large hæmatoma present and a contused wound about 1 inch long over occiput almost directly in line with the wound on the forehead he had received two days previously. He was dazed but not unconscious. His pupils were equal and circular and reacted to light and there was no evidence whatever of intracranial injury. An acriflavine dressing was applied and he was sent to bed. At this time (1515 hours) he had reached port and owing to an air raid warning was taken on shore on a stretcher to a shelter and back on board, about one hour later, to his bunk. He had been carefully moved and remained on the stretcher during the whole operation, never being allowed to move about or stand up. At 1700 hours he began

to complain of headache and nausea and was re-examined by another medical officer. His temperature was 98.2° F., pulse-rate 70, full and bounding. There was no evidence of intracranial injury and soon afterwards he fell into a natural sleep. At 1805 hours he was again examined and, apart from being rather drowsy, which was attributed to his having been asleep, no evidence of an intracranial lesion was detected. However, just as the medical officer was about to leave the bunk, the patient produced an epileptiform convulsion which lasted for about one minute. It commenced with general clonic movements and patient was unconscious for about five minutes. Injury to the tongue was prevented by immediate action on the part of the medical officer and there was no involuntary voiding of fæces and urine. He vomited on regaining consciousness, the pulse-rate rose to 106 and he began to sweat profusely. The pupils were at first fixed but later, although equal, reacted sluggishly to light. He was then transferred to a military hospital where he was admitted to a surgical ward.

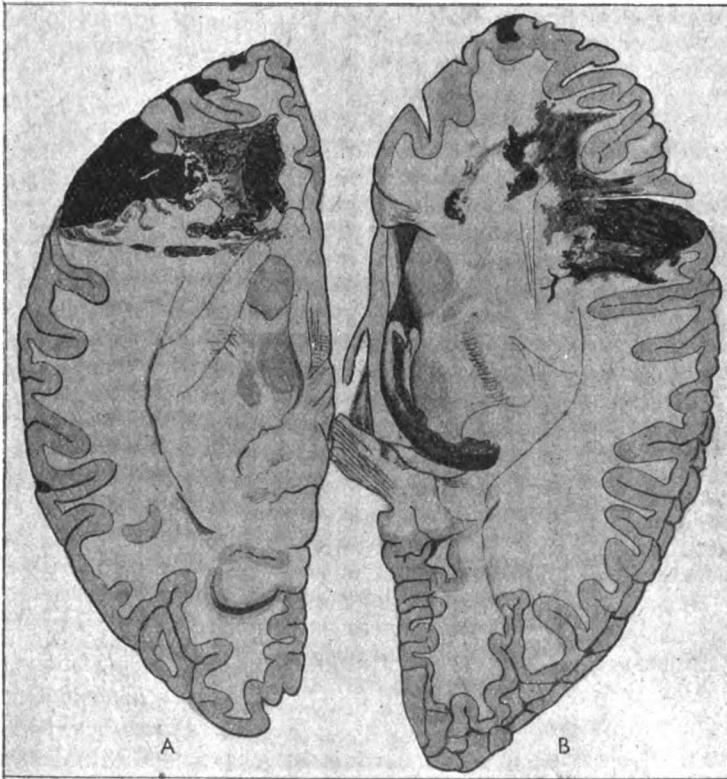
On admission to hospital the patient was drowsy and could only answer questions with difficulty and his reaction was very slow. The pulse-rate was 48 and irregular and the temperature was normal. The contused wound over occiput and superficial abrasion over forehead were noted but there were still no definite physical signs of intracranial injury. There were no abnormal findings in the cardiovascular, respiratory or abdominal systems. A lumbar puncture was performed and about 5 c.c. of blood-stained fluid were removed and sent for examination. The blood was evenly distributed throughout the fluid and the cells were fresh. After the lumbar puncture patient became much more rational and regained complete consciousness. At 2200 hours he again became restless and lapsed into unconsciousness from which he could not be roused. His pulse-rate was 50 and irregular, the breathing stertorous and slow. On examination of the nervous system there was a flaccid paralysis of the left side of the body, the abdominal reflexes were absent, knee-jerks increased and the left plantar response was extensor in type. Major Evans, R.A.M.C., medical specialist, saw the case in consultation and made the diagnosis of hæmorrhage of the right frontal region and advised surgical intervention with a view to relieving intracranial pressure. The skull was trephined by Surgeon-Commander Long, R.N. No extradural hæmorrhage was seen but the dura itself was under extreme tension due to blood in the subdural space. After operation his general condition improved but he never regained consciousness and died suddenly five hours later.

Post-mortem Examination.—The body was that of a well-developed male of average nutrition. His height was 5 feet 10 inches and weight 10 stones 9 pounds. There was a small superficial cut over forehead and a large hæmatoma with a laceration about 1 inch long over the occiput. There was no other evidence of external injury.

Thoracic Cavity.—There had been no injury to the tongue or obstruction of larynx. The mediastinum was normal and there was no evidence of injury to either ribs or parietal pleura. There was about 75 c.c. of slightly blood-stained fluid in both pleural spaces. The lungs were congested and there were small areas of subpleural hæmorrhage scattered over the posterior surface of both lungs and over the anterior surface of the left lower lobe. On section the whole of both lungs was hæmorrhagic throughout, the deeper hæmorrhages communicating with the subpleural markings. There was slight œdema present but no evidence of pneumonic consolidation. The right lung weighed 657 grammes and the left 602 grammes. The trachea and bronchi were normal and there was no evidence of

hæmorrhagic exudate. The pericardium was normal and the pericardial fluid was normal in both amount and appearance. The heart was of normal size and weight. The superficial surface of the whole anterior wall of both right and left ventricles and the whole lateral and posterior surface of the left ventricle was the seat of congestion and ecchymosis. On opening up the chambers of the heart it was seen that the injury to the muscle was superficial throughout, the hæmorrhage extending uniformly over the ventricular surface to a depth of about 1 mm. The heart valves were all normal. The coronary arteries and the aorta showed no pathological change.

Abdomen and Pelvic Cavity.—The peritoneal space was normal and con-



Cross-section of right cerebral hemisphere representing site of hæmorrhage. Note the multiple sites of origin and rupture externally.

tained no excess fluid. The liver was slightly enlarged but was firm and surface was smooth. The spleen was normal. The mucous membrane of the stomach wall was thicker than normal and there was excess mucus present but otherwise the alimentary tract was normal. The suprarenals and kidneys and pelvic organs were normal.

Skull and C.N.S.—There was a hæmatoma over the occiput the diameter of which was about the size of a five-shilling piece. The skull itself was intact apart from the trephine opening over the right frontal region. On opening the brain the dura was dark and bulging and the surface of both

cerebral hemispheres were covered with blood clot. There was a small clot at the base of the brain but most of the hæmorrhage was over the vertex and appeared to come from the deeper substance of the brain through a rupture of the right frontal cortex. There was some depression of the cerebral convolutions. The vessels at the base of the brain appeared normal and there was no evidence of aneurysm. After fixation the brain was examined and on section it was found that there was a large hæmorrhage in the substance of the right frontal lobe anterior to the lateral ventricle and coming to the surface about 2 inches from the anterior pole of the frontal lobe and thence reaching the subarachnoid space. There was no rupture into the ventricle. The hæmorrhage was multiple in origin (*see* diagram), coming from small vessels in an area in the frontal lobe extending for a width of about 3 inches from the thalamus medially almost to the cortex laterally. A very careful search of the blood clot and its surroundings was made but there was no evidence whatever of an aneurysmal sac and naked-eye appearances did not suggest the presence of a glioma.

Histological Findings.—Microscopical examination of the lungs showed generalized hæmorrhages throughout both lungs. The capillaries were congested throughout and the alveoli contained red blood cells in a fibrinous mesh. There was a slight infiltration of mononuclear cells but no evidence of inflammatory reaction. Some alveoli contained œdematous fluid and some were ruptured.

The myocardium of the contused area of the ventricular wall showed superficial hæmorrhages into the musculature with occasional tearing of the muscle fibres and rupture of the sub-pericardial vessels. There was some round-celled infiltration but no evidence of fibrosis. The deeper musculature was quite normal.

Histological examination of the vascular system of the base of the brain failed to reveal anything abnormal in the structure of these vessels. There was no evidence of defects of their walls either along their course or at the point of origin of their branches. Sections from the brain tissue of the hæmorrhagic area merely showed disorganized cerebral tissue mixed with recently extravasated blood. The vessels round about were congested but the walls were intact and of normal structure.

DISCUSSION.

This patient received direct injury on two separate occasions. When his ship struck a mine he received an injury on the forehead and may have been thrown against the ship's structure. Two days later he was swinging on a chain with his back to a hatch when the chain became unfastened and he fell backwards. He hit the end of the first flight of stairs five feet below with the back of his head and possibly shoulder and thence rolled downwards another five feet on to the deck. Neither could be called major injuries and the total external evidence of trauma was a cut on the forehead and a hæmatoma over the occiput. There were no marks or bruises over his chest or abdomen and all bones were intact. He was also subjected to the blast from the mine explosion.

The thoracic lesions revealed at post-mortem examination were contusion of the myocardium and pulmonary hæmorrhages scattered widely through both lungs. The thoracic cage itself was intact. These lesions may have been caused by direct chest injury either when the mine exploded and

he could possibly have been thrown against a fixed structure or two days later when he fell down the hatch. The blast from the mine explosion may have been an ætiological factor. It is now well known that direct injury to the chest wall can cause contusion of the heart without injury to the ribs or thorax. These cases of trauma of the heart have been reviewed by Barber and by Anderson and their significance emphasized, whilst Moritz and Atkins have carried out an experimental and pathological study on dogs and report the features which make it possible to differentiate between contusion and infarction and which help us to arrive at some conclusion as to the age of the lesion. The condition has also been reported on by Bright and Beck and by Warburg. On the other hand very little attention has been paid to the importance of blast as a cause of myocardial contusion. We have had the opportunity of studying cases of pure blast where the myocardium has shown naked eye and microscopic evidence of contusion and have pointed out that the cardiac element of blast is of considerable importance (Tunbridge and Wilson, 1942). In one of our cases of blast injury the aorta was ruptured though the chest wall itself was intact (Wilson and Tunbridge, 1942). We can thus state that in this case blast is a possible cause of the cardiac contusion. Further the definite naked eye and microscopic appearances would tend to favour a three-day rather than a more recent origin though too much stress cannot be attached to this. The lung lesions were extensive both macroscopically and microscopically and yet were sub-clinical throughout. Whilst pulmonary hæmorrhages are not pathognomonic of blast still they are the predominant feature and are characterized by being widespread and bilateral. Direct injury does cause lung hæmorrhages but then it is localized to the site of trauma. The histological picture corresponds to that described by Hadfield (1941) as occurring in thirty-six to forty-eight hours after a blast injury, i.e. mononuclear infiltration, fibrin formation in the alveoli and red cells showing signs of breaking up; the picture thus bearing some resemblance to the red hepätization stage of pneumonia. The œdema present may have been cerebral in origin but we have noted its presence in cases of pure blast without obvious cranial lesions. Thus the naked eye and microscopic appearance of the lungs is very suggestive of blast being the cause of the lesion.

Death was finally due to the intracerebral hæmorrhage and it is possible that, but for the onset of this accident, his recovery from the cardiac and lung injuries would have been uneventful. The elucidation of the pathology of the brain lesion is difficult. The age of the patient and histological examination of the vascular system would rule out such causes as arteriosclerosis and syphilis. There was no evidence of infective endocarditis and a glioma could also be excluded. No intracerebral aneurysm was found to account for the lesion but it is possible that an aneurysmal sac, which would probably be very small in any case, could be lost in the hæmorrhage and so overlooked. The absence of defects in the walls of the cerebral vessels elsewhere, especially at their bifurcation, was to be noted. A case of intracere-

bral aneurysm in a child of 4½ years has been reported* (Herman and MacGregor, 1940). A comparison with this case shows that the site and extent of hæmorrhage in both were the same and, apart from the fact that in the case I am reporting the hæmorrhage ruptured externally and not into the ventricular system, we could say that the general picture was similar. A point of major importance however in the case here reported is the multiplicity and scattered nature of the hæmorrhage. The bleeding did not come from one single vessel but appeared to come from points scattered over a wide field as shown in the drawing. This with the absence of evidence of aneurysmal sac would suggest another cause for the hæmorrhage. In 1891 Bollinger reported five cases where intracerebral hæmorrhage had occurred at intervals varying from a few days to several weeks after a minor head injury and suggested that the sequence of events was that, at the time of injury, an area of softening developed in the brain substance and later hæmorrhage took place from a vessel wall thus weakened. At the time Bollinger recorded these cases the occurrence of intracerebral hæmorrhage was not recognized and so later writers have thrown some doubt on his conclusions but others have admitted that some such lesions as he described are possible. Symonds (1940) has reviewed the literature and reported on a case of delayed cerebral hæmorrhage which recovered and which was probably traumatic in origin. He agrees that there is such an entity as delayed traumatic apoplexy but points out that it must be extremely rare. We suggest that this case may be an example.

SUMMARY.

(1) A case is reported of a man aged 21 who had been subjected to trauma on two separate occasions at two days' interval. The only external injuries were a superficial cut on the forehead and a hæmatoma and cut over the occiput.

(2) Post-mortem examination revealed cardiac contusion, evidence of pulmonary concussion and a large intracerebral hæmorrhage.

(3) The possible ætiology of these lesions is discussed.

I wish to thank Colonel A. S. Heale, M.C., D.D.M.S. of the Command, for permission to publish this case and also Surgeon Commander A. Long, R.N., under whose care the case was admitted to hospital.

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NOTES ON CASES OF SMALLPOX TREATED WITH SULPHANILAMIDE.

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INTRODUCTION.

DURING the autumn of 1942 a sharp civilian epidemic of smallpox occurred in an area in the Middle East Command. This reached its peak in November and, in the area in which the majority of the following cases occurred, 444 cases were reported during the months of October, November and December, a figure estimated to represent about one-third the total incidence. The estimated mortality was about 20 per cent.

During this period nine cases occurring amongst British troops were admitted to a New Zealand General Hospital. These, together with the case of one of the authors, commencing in September, and a Nursing Sister of the N.Z. Hospital (H. M.) make up the following series of eleven cases.

There were three deaths in the series.

The cases were classified as follows:—

Confluent: 4 cases, 3 deaths.

Severe: 3 cases, no deaths.

Mild: 4 cases, no deaths.

In all the cases except the three fatal ones the rash was that of smallpox "modified" by acquired immunity, the epidemic in general being one of severe Variola Major.

INCUBATION PERIOD AND SOURCE OF INFECTION.

Only in the cases of the Nursing Sister (H. M.) and one of the authors (J. D. C.) can the source of the infection be inferred. In the latter case exposure took place for about five minutes on one single occasion when visiting a local fever hospital in the very early days of the epidemic. Hence the incubation period can be worked out with considerable accuracy. The initial fever commenced on the afternoon of the ninth day and the rash first appeared in the early morning of the fourteenth day. In the other nine cases no source of infection could be traced though it is worthy of note that one soldier was stationed in the grounds of the local Quarantine Station then being used as an emergency smallpox hospital. Two other cases, who reported sick within two days of each other, slept in the same room and were presumably infected from a common source.

It may also be noted that another medical officer, who was present during the visit to the fever hospital in September, had a sharp five-day attack of fever commencing on the same date as did that of J. D. C. No rash developed but similar attacks have been noted in contacts in other epidemics and may represent abortive smallpox attacks.

VACCINAL HISTORY.

Whilst it is obviously impossible to draw any conclusions in such a small series yet certain facts may be stated here. In four of the cases no vaccination scars could be detected. Of these four, three died. The remaining case, aged 23, claimed to have been vaccinated in infancy and had a mild modified attack suggestive of considerable immunity.

All the other cases showed good "baby" scars. Of these seven cases four had had recent successful, though modified, "takes." These vaccinations were performed respectively twenty-nine months (severe case J. D. C.), twenty-two months (mild case H. M.), twenty-two months (mild case), and nine months (severe case) prior to the onset of the disease.

It is considered that the effect of a good "baby" vaccination is sufficiently long-lasting demonstrably to modify the effect of an attack of smallpox occurring twenty to thirty years later.

The nature of this modification will be discussed later in discussing the appearances of the true rash.

Three of the patients were re-vaccinated for the first time since infancy within the incubation period. In two of these cases the vaccination was probably too late to affect the course of the disease, being performed three and two days before the onset of smallpox and modification appeared to be due to "baby" vaccination. Their ages were 30 and 28 respectively. The third case was vaccinated six days before the onset and had a severe, though modified attack.

PRODROMAL RASHES.

Three cases only had prodromal rashes.

Both the usual types were seen, i.e. erythematous and petechial. One case was admitted as a case of measles; seen in an artificial light the diagnosis was "confirmed," even "Koplik's spots" being present. By the next morning a few vesicles were present on the face and the Koplik's spots had multiplied and were obviously the smallpox rash appearing in the mouth. This was a severe case.

Two cases of petechial rash were seen. In one the rash was more or less generalized on the trunk and limbs, intensified in the groins and axillæ. In the other it was practically confined to the axillæ and bathing drawers area. This case died. In addition to the petechial element bright pink macules and "flush" were observed in the area of the rash. All the cases with prodromal rashes subsequently had widespread rashes and fell into the severe or confluent group.

TRUE RASH.

The true rash as seen in this small series showed very clearly the classical differences induced by the presence or lack of a degree of acquired immunity in the patients. It is therefore proposed to describe separately the "modified" and "unmodified" rash as seen in these patients, together with a further "modification," due we believe to the exhibition of sulphanilamide.

It must be emphasized at once that the differences seen were essentially differences of *nature* rather than *extent*. Whilst in some well-vaccinated cases the rash merely consisted of a few countable papules and vesicles yet, in other successfully vaccinated cases, the extent of the rash was as great or greater than in the unvaccinated cases (*see* fig. 1).

In the unmodified cases the rash followed closely the typical textbook description with this significant exception that, even in the case which died on the fourteenth day, *no true pustules developed*. This is believed to be due to the exhibition of sulphanilamide. Apart from this modification the time taken in maturation and the appearances were quite typical and need no further description (*see* fig. 4).

In the cases whose rashes had been modified by previous successful vaccination certain characteristic changes were observed. The most striking of these was the speed of maturation of the rash. In the cases observed from the beginning, careful search would often reveal one or two vesicles at the time the rash was first noted. Thus, while in the fatal unmodified cases scabbing was by no means complete on the twelfth and fourteenth days, yet in even some of the moderately severe modified cases all the scabs had *separated* by the fourteenth day and scabbing was usually complete by the eighth to the tenth day at the latest.

In the modified cases the size of the individual pocks was much smaller though their actual numbers may have been greater. The case presenting with a morbilliform rash later had his face studded with hundreds of miliary vesicles, some a millimetre or less in diameter. Nevertheless in areas of pressure or local damage (i.e. garter area) these vesicles would be confluent. Classical confluence was also seen on the face (fig. 1).

In the modified cases the vesicles were much more superficial and tended to "fungate" outwards; this superficial character of the modified rash gave almost a false impression that these cases were more severely affected than the cases with the deeper unmodified rash.

Finally, in the protected cases, a proportion of the rash would "abort" at the papular or early vesicular stage, giving an appearance of false "cropping."

Nevertheless, despite these modifications, the fundamental characters of the smallpox rash remained. There was no true "cropping" and the sites affected were the classical smallpox sites.

Typical "melon-seed" bodies formed on the palms and soles and these small amber coloured discs could be slipped out of their "nests," when the thick overlying skin was incised, in the typical manner. Incidentally, it is

felt that these "melon-seed" bodies may be of considerable diagnostic significance in mild cases seen late in their course.

GENERAL CONDITION OF CASES.

The general condition of the patients on admission to hospital was much the same in all cases. Frontal headache, pains in the fascial planes and general weakness were constant findings while pain in the back, of a degree sufficient to warrant a spontaneous remark upon it by the patient himself, was present in only two of the series.

Dysphagia was present in five cases and commenced about the fifth or sixth day after the appearance of the rash.

Mental dullness progressed in four of the cases to a low muttering delirium and, in two of those with fatal outcome, two attempts to get out of bed and to active interference with nursing measures.

Vomiting was pronounced in four cases and, in the early stages, interfered with the fluid intake. Only in one of the severe and fatal cases did vomiting persist.

PROGNOSIS.

Few conclusions may be drawn on prognosis from such a small series but the following points emerge:—

(1) *Vaccinal State*.—It has been shown that of four cases presenting no vaccination scars three died.

A successful re-vaccination even nine months prior to contact with smallpox infection does not necessarily protect against an attack. The resulting illness will be modified.

(2) *Prodromal Rashes*.—Cases showing a petechial prodromal rash were severe and one died.

(3) *Severe Constitutional Symptoms*.—If these were present at onset, especially if accompanied by vomiting, they indicated a bad prognosis.

(4) *Extent of Rash*.—In vaccinated subjects the rash may be more extensive yet recovery will occur.

(5) *Failure of Primary Temperature to Resolve*.—This indicated an extremely grave prognosis.

(6) *Rising Pulse Rate*.—Cases which showed a rising tendency in the pulse rate at eighth to ninth day were attended with fatal outcome.

TREATMENT.

The treatment of the foregoing cases of smallpox can be discussed under the headings of:—

(a) *General and symptomatic*.

(b) *Chemotherapeutic*.

(a) *General and Symptomatic*.—While the usual recommended measures were adopted with regard to diet, sleep, the control of restlessness and delirium, constipation, cough, the toilet of eyes and mouth, collapse,

cyanosis, vomiting, etc., the treatment of the following may be worthy of note.

Care of Skin and Treatment of Rash.—In view of the absence of a purulent stage the usual and recommended treatments were modified by the application to the rash of a simple calamine lotion containing 1 per cent menthol and 1 per cent acid carbol. liq. as antipruritics. This we found to be greatly appreciated by the patients.

Dysphagia.—Next to the skin irritation, and combined with the dry non-productive cough, we found this to be the most distressing complication. In three cases it definitely cut down the fluid intake. Major Neil, Oto-Rhino-Laryngologist to the unit, recommended the official cocaine trochiscus but this not being on issue the dispenser improvised a lozenge as follows: Gelatine, 1 ounce; glycerine, 1 ounce; water to 4 ounces, all by weight.

To the above, cocaine hydrochloride was added in the proportion of one quarter of a grain of the cocaine salt per lozenge with enough for forty lozenges. This proved highly satisfactory, the patient demonstrating his gratitude for the relief obtained by increased fluid intake when a lozenge thus prepared was sucked before the taking of a drink.

(b) *Chemotherapeutic.*—The fortunately few opportunities which have presented themselves for studies upon the value of drugs of the sulphonamide series in smallpox account, presumably, for the paucity of the literature upon the subject.

In 1938 King and Rosario reported favourably upon the use of prontosil in one case, commenting upon the absence of the secondary rise of temperature usually associated with the pustular stage of the disease.

McCammon, in 1939, reported upon the use of sulphanilamide in four of a series of seven cases of smallpox observed by him. He commented upon the absence of a pustular stage in three of the cases so treated the remaining one merely showing three or four pustules.

Whereas in 1940 German literature indicated the sulphonamide series as the therapy of choice in smallpox and Manson-Bahr, Harries and Mitman in the 1940 editions of their books advocated it. Kolmer (1940), in a full review of the literature upon the therapeutic value of all the drugs of the sulphonamide series then in use, sums up the value of them in smallpox as "doubtful."

It was thought that the present series of cases, small as it is, might offer something in the way of evaluation of this form of therapy and, with this end in view, recourse was had to the pathological and histological findings in fatal cases by means of which we hoped to gain some idea of the response, if any, of the actual virus to the drug as well as any effect it might have upon the secondary invaders.

The drug employed was "sulphanilamide" (May and Baker).

An initial dose of two grams was given, followed by one gram four-

hourly, this dose being reduced to one gram three times a day when the condition of the patient was seen to be ameliorating.

Treatment was commenced as soon as the vesicular stage was reached and the average total dose was 22.5 grams given over six days.

Toxic Effects.—No serious toxic effects were seen. Five cases showed some cyanosis probably more referable to the pulmonary oedema and general toxæmia than to the sulphanilamide *per se*.

GENERAL PROGRESS OF CASES.

The main, if not sole, effect of the sulphanilamide appeared to be the reduction of complications due to pyogenic organisms; no effect was detected on the essential virus. There was definite mitigation of suppuration in the skin lesions, a lessening of ocular complications and a reduced incidence of pulmonary complications.

Instead of a true pustular stage there was a vesicular stage in which the vesicular fluid was slightly milky and not yellow even in those cases with a fatal outcome. The process was later one of desiccation and desquamation rather than of the classical pustulation and scabbing.

No more different a picture could be imagined than that observed by one of us (H. T. K.) in Central African natives during smallpox epidemics. Here the rash ran its textbook course, each vesicle becoming a yellow pustule which, in the confluent cases, brought away the superficial epidermis as abscess roofs.

It is not believed that the reduction of complications due to pyogenic invaders is the result solely of improved skin and ocular hygiene.

The case of a mission hospital trained native midwife's child is something in the nature of a control (H. T. K.). In this case, despite all which could be done apart from chemotherapy in the care of eyes and skin, a profuse purulent conjunctivitis developed. There was pustulation resulting in slight "pocking" but otherwise complete recovery in every respect. In addition it is reported that, in a recent epidemic in a military hospital in Iraq, cases not given sulphanilamide have developed typical creamy pustular rashes. (Personal communication.)

With regard to the ophthalmic complications, which are too often the sequel to an attack of smallpox among uncivilized and unhygienic races where purulent conjunctivitis may develop into panophthalmitis with complete destruction of the globe, in this series five of the cases had a serious ocular discharge, one being frankly purulent. These lesions underwent complete recovery, there being no ulceration visible even in cases coming to autopsy.

We confirmed the observations of McCammon, King and Rosario upon the effects of chemotherapy as registered upon the temperature chart. There was no textbook secondary rise of temperature about the ninth or tenth days. The residual cutaneous lesions of the recovered cases were merely slowly fading macular erythemata with extremely minute "pock-



FIG. 1.—Case P.



FIG. 2.—Case P.

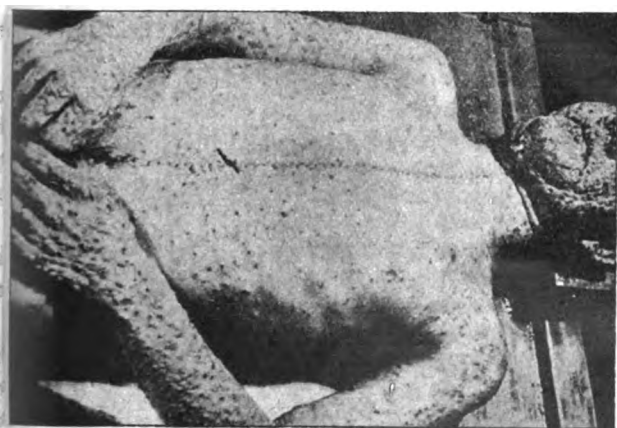


FIG. 3.—Case J.



FIG. 4.—Case J.

FIG. 1.—Case P., 10th day. Aged 30. Vaccinated in infancy. *Good* scar. This picture shows the outward "fungation" of the epithelium of the face with confluence of rash.

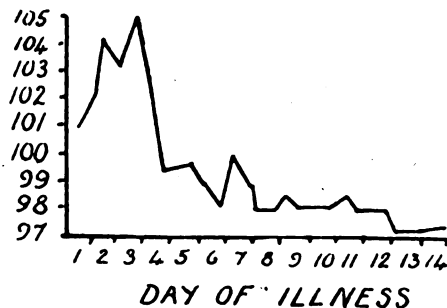
FIG. 2.—Case P., 16th day. By reason of lighting difficulties this picture does not do justice to the completeness of recovery, pitting being almost absent. The mottled areas showing were only faintly macular.

FIG. 3.—Case J. Death 12th day. Aged 22. History of vaccination in infancy. Photographs at autopsy. *No* scar. This demonstrates the classical centrifugal distribution of a smallpox rash sparing the flexures.

FIG. 4.—Case J. Showing the marked oedema of the cutaneous and subcutaneous tissues.

ing" but it must be admitted that the recovered cases were "modified" cases.

In conclusion it is believed that the suppurative stage can be greatly reduced and, in many cases, abolished and, in addition, the incidence of other complications due to sulphonamide sensitive organisms, e.g. bronchopneumonia and conjunctivitis, considerably lessened. It is only fair to assume that lessened suppuration will lead to reduction in subsequent scarring. Lest it be contended that the absence of secondary fever and extensive scarring are solely due to the fact that these are modified cases, the temperature chart and photographs of a case of confluent "modified" smallpox are included.



Temperature Chart. Case P. shows the absence of secondary fever.

PATHOLOGY.

A complete post-mortem examination, with the exception of the cranial cavity, was done on each of the three fatal cases.

The findings were those of a generalized toxæmia especially affecting the adrenals in which, in two of the cases, there were macroscopic and, in the remaining one, microscopic hæmorrhages.

All cases showed the pocks extending from the oral cavity into the larynx. In one case the pocks extended as far as the bifurcation of the trachea and in the others pocks were showing in the smallest dissectable bronchioles.

In all cases the lungs showed marked œdema but in one case only was there microscopic evidence of an early bronchopneumonia.

Microscopical section through the skin pocks showed a heaping up of the normal squamous epithelium about the pocks and a heavy infiltration by acute inflammatory cells. Considerable necrosis extended into the subcutaneous tissue. At the time of the cutting of the sections remnants of the trabeculæ could be made out but the majority had broken down and become disintegrated.

SUMMARY.

Eleven cases of variola of varying severity occurring in Middle East Forces have been followed. The effects upon them of sulphanilamide have been studied. Attention is drawn to the following points:—

(1) The prophylactic value of a good "baby" vaccination in modifying the mortality from the disease.

(2) The modification of the rash due to the exhibition of sulphanilamide, i.e. no true pustular stage developed.

(3) The modification of the "classical" variola temperature chart by the exhibition of sulphanilamide, etc., abolition of secondary fever.

(4) The lessening of the pyogenic coccal complications in eyes and lungs by sulphanilamide.

(5) The extent to which the pocks invade the bronchial tree.

(6) The apparent lack of any effect of sulphanilamide upon the actual virus of smallpox.

ACKNOWLEDGMENTS.

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A SURVEY OF METHODS OF TREATMENT OF TROPICAL ULCERS.¹

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INTRODUCTION.

THE purpose of this paper is to record observations on the treatment of 156 cases of tropical ulcer occurring in West African native soldiers stationed in Sierra Leone. The time lost from duty by troops suffering from tropical ulcer is such that it is necessary to find the quickest method to return these men to full service. Various lines of treatment have been tried and are here compared.

INCIDENCE.

Military records of the number of hospital admissions for tropical ulcer from May 1, 1938, to December 1, 1941, are shown in the following table:—

TABLE I.

Year	Hospital Admissions African	No. Cases Tropical Ulcer	Per cent.	Days per case
1938	215	34	15.81	6
1939	550	28	5.09	13.5
1940	1155	80	6.92	16.8
1941	4541	204	4.33	29.3

Admissions prior to 1941 were to a C.R.S. from which patients were discharged to units for final treatment. All cases treated in 1941 were completely cured on discharge. During the period January 1, 1941, to December 1, 1941, there were 2,834 admissions of European soldiers and officers to the hospital, none of whom suffered from tropical ulcer.

TABLE II.

DURATION PRIOR TO ADMISSION TO HOSPITAL OF 97 CASES.

Time in weeks	Number of Cases	Percentage
0—4	71	73%
4—12	17	18%
Over 12	9	9%

97 cases averaged 5.51 weeks per case prior to admission.

CLASSIFICATION OF TROPICAL ULCER.

Tropical ulcers fall into three groups, depending on the origin and duration.

(a) Recent ulcers with a history of trauma, or the formation of a non-traumatic vesicle.

(b) Recent ulcers of the above type but becoming phagedænic in character.

(c) Chronic or recurrent ulcers originating from (a) or (b).

¹ Forwarded by permission of Colonel L. A. Harwood, T.D.

ÆTIOLOGY.

A history of definite trauma was obtained from 91 out of 156 cases or 58·3 per cent. The injuries take the form of cuts by barbed wire, machette or glass, abrasions on stone or in bush or scratches at the site of scabietic infections. The remaining cases could not give a definite cause for the start of the ulcer. The troops wear boots or puttees only when marching in the bush; puttees only on parades and fatigues. The result is seen in the fact that, in 156 cases having 175 ulcers, 78 per cent of the ulcers were situated on the feet and ankles (as shown by the following table).

TABLE III.
SITE OF ULCERS (175).

Site	Right	Left
1. Leg anterior	11	13
2. Leg posterior	5	10
3. Dorsum foot	17	22
4. External malleolar region	10	11
5. Internal malleolar region	7	20
6. Great toe and 2nd toe	13	12
7. Other toes	5	4
8. Heel and plantar aspect of foot ...	8	7

DIET.

(a) Scale of rations for African Rank and File and authorized followers R.W.A.F.F. as from December, 1941, are:—

Item	Quantity	Notes
(a) Daily Issues.		
(i) Meat fresh (beef or goat flesh)	6 oz.	
or		
Meat preserved	4 oz.	
or		
Fish fresh	8 oz.	
or		
Fish preserved	4 oz.	
(ii) Maize Flour	8 oz.	Will be issued three times weekly to natives of Nigeria, Sierra Leone and Gambia and twice weekly to natives of the Gold Coast.
or		
Rice and	4 oz.	Will be issued three times weekly to natives of Nigeria, Sierra Leone and Gambia and four times weekly to natives of the Gold Coast.
Palm oil	2 oz.	
or		
Bread and	6 oz.	Will not normally be issued.
Maize or rice	4 oz.	
or		
Bread and	6 oz.	Will not normally be issued.
Palm oil	2 oz.	
or		
Biscuit	8 oz.	Will be issued once weekly to all troops.
(iii) Salt	$\frac{1}{2}$ oz.	
(iv) Peppers, country condiments, Dawa-Dawa Egusi, etc....	$\frac{1}{2}$ oz.	
(v) Rice	20 oz.	Will be issued once weekly to natives of Nigeria, twice weekly to natives of Gold Coast and five times weekly to natives of Sierra Leone and Gambia.
or		

Guinea cornflour	...	...	20 oz.	Will be issued three times weekly to natives of Northern Nigeria and once weekly to natives of Southern Nigeria.
or				
Maize flour	...	...	1 lb.	Will be issued twice weekly to natives of Southern Nigeria, Sierra Leone and Gambia and once weekly to natives of the Gold Coast.
or				
Yams (or potatoes)	...	...	3 lb.	Will be issued twice weekly to natives of Northern Nigeria, three times weekly to natives of Southern Nigeria and four times weekly to natives of the Gold Coast.
or				
Millet (gero flour)	...	...	1½ lb.	Will be issued once weekly to natives of Northern Nigeria.
(vi) Palm oil	...	...	2 oz.	
(vii) Native vegetable	...	...	*8 oz.	
(viii) Fruit	...	...	4 oz.	
(ix) Native beans, lentils, split				
peas or ground nut	...	...	2 oz.	
(x) Sugar	...	...	1 oz.	
(xi) Cocoa (or local coffee)	...	...	½ oz.	
(b) Weekly Issues.				
(i) Cigarettes native	...	...	10	
or				
Tobacco	...	...	2 oz.	
(ii) Soap	...	...	4 oz.	
(iii) Kola nuts	...	...	2 oz.	

Note : *When procurable.

Meals—African Troops.

- | | | |
|----|------------|-------------------|
| 1. | 6.30 a.m. | Bread and coffee. |
| 2. | 11.30 a.m. | Full rice chop. |
| 3. | 5.00 p.m. | Full rice chop. |

This is in contrast to the civilian population who have one main meal a day—at midday.

(b) Tropical ulcers in African troops in Sierra Leone are more common in recruits with less than nine months' service than in old soldiers.

Ulcers found in Nigerian troops tend to be larger and more heavily infected than in Sierra Leone troops, this being due in part to the difficulty in obtaining proper Nigerian food (maize, etc.) which differs from the diet of the local troops.

While the diet of the African troops is better than the average civilian diet it is, nevertheless, a low protein diet¹ which tends to ulcer formation (James [1]).

During the first part of the wet season fresh fruit is difficult to obtain, a factor in the general dietetic deficiency of vitamins and calcium (Brown [2]).

For full discussions on diet and tropical ulcer the reader should refer to the excellent papers of Corkill [6] and James.

INFECTION AND ASSOCIATED DISEASES.

As 58.3 per cent of cases were due to trauma and, as cases of trauma treated by the writer, whilst acting as a R.M.O., with iodine and strapping

¹ Even after full allowance has been made for wastage in preparation and cooking of the ration, the protein content must still be well above the 70 grams considered adequate for an adult male.—EDITOR.

immediately after injury never developed ulcers, it would seem that untreated wounds with secondary infection tend to develop into ulcers.

All the troops affected were subject to chronic malaria, exhibited chiefly when exposed to severe weather or fatigues. Most soldiers had old ulcer scars on the legs and feet. No cases suffered from leprosy.

PATHOLOGY.

Pathological investigations were carried out on a series of patients with the following results:—

(1) Dark ground illumination		45 cases
(a) Spirochaetes	present	9 cases
	absent	27 cases
(b) Motile bacillus	present	6 cases
(c) a and b combined	present	3 cases
(2) Culture from ulcerated surface		28 cases
(a) <i>Staphylococcus aureus</i>		7
(b) <i>Staphylococcus albus</i>		4
(c) <i>Bacillus proteus</i>		5
(d) <i>Staphylococcus aureus</i> and <i>albus</i>		7
(e) <i>Bacillus proteus</i> and <i>Staphylococcus aureus</i>		2
(f) No organism grown		3
(3) Kahn reaction		56 cases
Positive	32	57.1 per cent.
Negative	24	42.9 per cent.
(4) Blood examination		28 cases
(a) Average R.B.C.		4,321,000
(b) Average Hb.		83.9 per cent.
(c) Average C.I.		0.87 per cent.

TREATMENT.

(1) Preventive Measures.

(a) Iodine and strapping should be immediately applied to all wounds.

(b) Boots and puttees should be worn on all parades, fatigues and marches.

(c) Malaria should be energetically treated by quinine, plasmoquine, etc. Camps should be in malaria free areas.

(d) Protein content of the diet should be raised and adequate vitamins ensured by administration of marmite and ascorbic acid. In the wet season when fresh fruit is scarce the incidence of ulcers increases.

(2) General Treatment.

(a) *Diet*.—In view of the findings of Connell and Buchanan [3] (1933), Clements [4] (1934), Loewenthal [5] (1932), all quoted by Corkill [6] (1939), and James [1] (1938), and, as many of the patients exhibited clinical evidence of avitaminosis, i.e., blueness of gums, buccal frieze and glossal lividity, ulcer cases were placed on the standard diet for African troops supplemented by:—

(1) *Ascorbic Acid Tablets* (0.025 gm.) in the following dosage:—

1st day — 15 tablets.

2nd day — 15 tablets.

3rd day — 10 tablets.

Thereafter 4 tablets daily during treatment.

(2) *Marmite*.

One tablespoon daily (as a hot drink).

(3) *Oleum Morrhuæ*.

One drachm t.d.s.

(4) *Calcium Lactate*.

Grains xv t.d.s.

Twenty-five consecutive cases were given the supplemental diet. The average stay in hospital was thirty-one days per case. These cases were on different types of local treatment, however, and we are therefore unable to comment on the conclusions of the investigators quoted above.

(b) *Associated Diseases*.—Only those cases developing malaria in the wards were treated with quinine and plasmoquine. Facilities were not available for routine stool examinations hence investigation and treatment of the helminthic factor could not be undertaken except in cases exhibiting acute clinical symptoms of helminthic infestation. Cases having a positive Kahn were divided into two groups:

(i) Ulcers clinically typical of syphilitic infection. These cases were treated by a routine arsenical course until the ulcer healed and they were then sent back to units for completion of antisyphilitic treatment.

(ii) Ulcers clinically non-syphilitic. These received: (a) Acetylarsine 3.0 c.c. every other day for 7 injections, or (b) Sulphostab 0.45 gram every fifth day for 5 injections.

A number of cases exhibiting a negative Kahn also received the arsenical treatment detailed above.

In both the groups so treated the healing rate was not different from the healing rate of cases not receiving arsenical treatment.

(3) *Local Treatment*.

Most forms of treatment are divided into two stages: (1) stage of cleaning the ulcer; (2) stage of healing or epithelialization. Various methods have been tried:—

(1) *For cleansing purposes*.—Excision, cauterization, or the application of zipp, copper sulphate, ox-bile, sulphanilamide or M & B "693."

(2) *To stimulate epithelialization*.—Application of cod-liver oil, various dyes and elastoplast.

Corkhill [6] advised cod-liver oil dressings; James [1] copper sulphate and elastoplast for small ulcers—excision and skin graft for large ulcers; Earle [7] found oral administration, or local use with elastoplast, of sulphanilamide and M & B "693" to have no effect on chronic ulcers but to

be of some use in recent ulcers; Brennan [8] in East Africa found an ointment of cod-liver oil, eusol, vaseline and ung. zinci useful for cleaning up ulcers; McGuire [9] used copper sulphate daily for cleaning; Duran [10] advised zinc oxide-ichthyol ointment to clean, then 1 per cent picric acid daily, followed by zinc paste and elastoplast; Bell [11] suggests potassium permanganate powder, eusol and, when clean, adhesive plaster; Fusco and Chionetti [12] used daily ox-bile dressings; Dale [13] and Buchanan and Sanderson [14] advise zipp and plaster of Paris bandage.

A.—Treatment of Ulcers other than those involving Toenails.

A comparison of results in 87 cases treated by various methods is tabulated below. All cases were kept in bed until reasonably clean; once clean they were treated as up-patients but not employed on fatigues until a few days before discharge. Cases undergoing pathological investigations were treated with saline dressings until the laboratory work was done, usually for forty-eight hours; they then commenced the type of treatment decided on.

TABLE IV.

Type of Treatment	Number of cases	Hospital days per case
Elastoplast changed every 7 days	24	32·6
M & B "693" powder and elastoplast changed every 5 days	4	33·6
Sulphanilamide powder and elastoplast changed every 5 days	5	56·2
Saline dressings twice daily	6	28·6
Saline soaks and sulphanilamide compresses daily	10	28·4
Zipp and elastoplast	10	19·8
AgNO ₃ 5 per cent. and zipp and elastoplast	8	19·8
Zipp and elastoplast and cod-liver oil dressings daily when clean	10	26·6
Cod-liver oil dressing daily	6	26·5
Triple dye and cod-liver oil dressings daily	4	28·00

Of the remaining 40 cases (not including 28 cases of ulcers involving the toenail) which were treated by various combinations of the above methods, 11 cases made no real improvement until finally placed on zipp and elastoplast dressings. Cases treated by scraping the ulcer, cauterizing the ulcer with 10 per cent AgNO₃ and then applying zipp and elastoplast did not heal quicker—due probably to the necessity of replacing some of the granulations removed.

From the experience gained in treating the above 127 cases a routine local treatment was decided on.

(1) Small ulcers under 2·0 cm. diameter were treated by zipp and elastoplast changed every seven days until healed.

(2) Medium ulcers of approximately 2·0 cm. to 4·0 cm. diameter were cauterized with 5 per cent AgNO₃ for three minutes; this was washed off with saline; then zipp and elastoplast employed until clean; finally either daily or every other day dressing with cod-liver oil or daily application of triple dye solution was done.

(3) Large ulcers over 4.0 cm. diameter were treated with zipp and elastoplast until clean (seven to ten days) and then by Thiersch graft or by immediate excision of ulcer and scar tissue (best for chronic ulcers) followed by immediate Thiersch graft.

Note.—(a) Zipp—Zinc oxide and iodoform ... 1 part each
 Soft yellow paraffin ... 2 parts
 (b) Triple dye—Crystal violet ... 0.2 per cent
 Acriflavine ... 0.2 per cent
 Brilliant green ... 2.0 per cent
 Aqueous solution.

B.—Treatment of Ulcers Involving Toenails.

Tropical ulcers involving the nail beds of the toes present a somewhat different picture from the standpoint of treatment. Twenty-eight cases are here reported. These cases occur from stubbing the toes, injury by rifles, etc. The picture is that of a typical tropical ulcer plus a deep-seated fungoid infection under the nail and skin which is very slow to heal by ordinary methods of treatment.

Various types of treatment were tried, i.e. saline dressings, M & B "693" powder and elastoplast; elastoplast only; foment and sodium sulphate; 12½ per cent flavine emulsion. Finally a combined operative and cauterizing treatment was devised.

TABLE V.

No. of cases	Treatment	Hospital days per case
20	Various treatments	47.9
8	Removal of nail, curettage of nail bed and cauterize by AgNO ₃ 10 per cent. for 3 minutes followed by saline, zipp dressings daily until clean; then either triple dye daily or C.L.O. every second day until healed	23.0
The above treatment plus the supplemented diet is the routine treatment used here for all tropical ulcers involving a toenail.		

SUMMARY.

- (1) 156 cases of tropical ulcer in African troops have been reviewed.
- (2) The ætiology has been noted.
- (3) The preventive measures, general and local treatment of tropical ulcers have been discussed.
- (4) A plan of treatment for ulcers other than those involving toenails has been described.
- (5) A method of treatment for ulcers involving the toenail is detailed.

The writer wishes to thank Lieutenant-Colonel F. A. R. Stammers, R.A.M.C., and Lieutenant-Colonel John Bruce, R.A.M.C., for their kindness and help in the preparation of this paper.

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OCCUPATIONAL THERAPY FOR PSYCHONEUROTICS IN HOSPITAL.

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In the early days of this War there were few special hospitals set apart for the treatment of War Neuroses. Such cases as arose were for the most part dealt with as out-patients in General Hospitals. As the Army grew in numbers and neuroses from Norway and France arrived in this country the need for special hospital facilities became greater.

REASONS FOR ADMISSION TO HOSPITAL.

Psychiatrists in the Army are of necessity limited in number. They are posted to certain military centres and each deals with all the military psychological casualties that arise in the surrounding area, often covering many square miles. It is frequently necessary to recommend repeated psychiatric interviews for cases of severe neurosis. If these cases are widely dispersed in the area it is impossible to have them attending as out-patients for several reasons; so much time is wasted on journeys, the soldier has to be excused all sorts of duties and discipline becomes slack and he may be a source of psychological infection in the unit. Thus it comes about that neurotics requiring more than a few psychiatric interviews are admitted into special hospitals for observation, investigation and treatment. It is on observations made in one such hospital that the following notes are based.

PROBLEMS OF HOSPITAL MANAGEMENT.

As most psychoneurotics have no physical illness these hospitals are faced with the novel situation of having their beds filled with patients who do not need to be in bed at all by day. These men are inspected each morning by the Medical Officer on his daily ward round but treatment is carried on for the most part in personal interviews. About thirty cases are allotted to each Psychotherapist and if he can interview each case on alternate days for half an hour in addition to his other hospital routine duties he is not letting the grass grow under his feet. It follows that the patients have a good deal of spare time on their hands and it has been found that if the daily routine is not properly organized such military morale as these patients have possessed is rapidly lost.

TYPE OF PATIENTS.

The patients dealt with include hysterics, anxiety neurotics, obsessionals, borderline oligophrenics, psychopathic personalities and psychotics. 50 per cent of our hospital beds are allotted to neurotics, 25 per cent to psychotics and 25 per cent to the borderline cases, psychopaths, delinquents, etc.

The neurotic cases may be divided into two rough groups: (a) Acute war neuroses in which the condition has been precipitated by war trauma; (b) subacute and chronic cases not precipitated by war trauma but brought about in predisposed persons by lack of adaptation to the community life of the Services.

With us the second group predominates and a great part of our work consists in dealing with this maladaptation.

Most of these neurotic cases are self-centred, individualistic and poor mixers. Left to themselves they become very readily "browned off." They bore each other with the recital of their complaints. They become discontented, depressed and often truculent and very quickly an atmosphere can spread through the hospital which is anything but conducive to cure. As a great number of our neurotics are extremely suggestible one disadvantage of having numbers segregated in a special hospital is that cases of cross-infection may occur. In civil nursing homes for neuroses the patients, in their own interests, are strenuously exhorted to refrain from mentioning to their fellow sufferers anything about their symptoms or treatment. Obviously such exhortation cannot be so effective in the Services.

OCCUPATIONAL THERAPY.

The importance of Occupational Therapy for Psychotic and Orthopædic cases has long been recognized and therapists to-day are specially trained—and well organized. The need for this therapy for neurotics is, however, not sufficiently appreciated. Of course, during the Great War, "shell shock" hospitals had their handicraft centres but, to-day, it is necessary to get beyond the "arty crafty" stage of occupational therapy, merely as a pastime for bored individuals, to the conception of the use of specially selected graduated occupations as a positive help in the cure of the neuroses. Perhaps this neglect of occupational therapy and its use in the treatment of the neurotic is due to the fact that in civil life neurotics are for the most part treated as out-patients who carry on with their normal work and live in their usual environment in the intervals between psychotherapeutic interviews.

Thus it happened that no provision was made in Military Hospitals for the employment of specially trained occupation therapists nor were there any funds available for the purchase of raw materials or tools for handicrafts. The organization of an adequate occupational therapy department was accordingly left to the importunity of the medical officers and the

generosity of such local inhabitants as could be sufficiently interested in the project.

SUPPLY OF RAW MATERIALS AND TOOLS.

An account of the measure of our success in establishing a satisfactory occupational therapy department may be helpful to medical officers elsewhere. When we first started this department here we were fortunate in obtaining the voluntary services of a trained Occupational Therapist, the wife of an officer in the Garrison, who gave a series of lectures and demonstrations to the nursing and medical staffs and set us off on the right lines.

We have also been fortunate in being well-served by generous local inhabitants. We happen to be within five miles of a city with a first-class Technical School. The authorities there allow us to send, gratis, a party of thirty men for a two-hour session on two afternoons a week. There our patients receive instruction in woodwork, weaving, clay modelling, metal work, drawing, lino-cutting and sign writing. More important than this, certain of the Technical Staff, notably the Woodwork and Drawing Instructors, visit the hospital regularly and conduct classes in the day rooms. The practical work thus begun is continued in sessions supervised by our N.C.O.s in the intervals between visits from the Instructors.

The problem of funds for raw materials and for Technical Instructors has been overcome by various methods. A special Occupation Therapy Account was formed into which patients paid cost price for any material used in constructing articles for their own use. Any orders executed for benevolent patrons outside the hospital were sold to them at market price. The sale of our Christmas Cards made on the premises to the hospital staff and patients brought in a substantial profit.

We have been enabled to carry on woodwork classes in the hospital daily by a loan of carpenters' benches and tools from the local civil Education Authorities whose Training School premises for primary teachers was commandeered for other purposes. Carpenters' tools can now be obtained for this purpose from Ordnance and taken on hospital charge.

Basketwork, rug making, needlework (sock darning) and weaving on small handlooms made in our own woodwork classes have been conducted in the hospital by ladies from the local Blind Welfare Association who have given their services voluntarily.

A large amount of furniture damaged in air raids was obtained through the good offices of a local officer patient. This was invaluable material for our woodwork class.

Much has been begged, borrowed or acquired. In fact there is no wile or nuance of mendacity or mendicancy to which we have not descended to secure the materials essential for the maintenance of this department.

ARMY EDUCATIONAL CORPS.

The A.E.C. is responsible for arranging activities which may be classed as diversional occupation and the local Area Army Education Officer has

been one of our most invaluable collaborators. Certain materials such as drawing paper, pencils and paints and a limited amount of timber were indented for through his department. The Army Education Officer has been able to secure for our visiting Technical Instructors some financial return for the time spent in this hospital. In addition he has arranged during the Winter Sessions for two evening lectures per week, often illustrated by lantern slides, on a variety of subjects. This is just part of the general Army Education Scheme and for this purpose our patients are looked upon as forming a self-contained unit. He has also been most helpful in the matter of transport for these varied activities.

A Serjeant of the A.E.C. has been allotted to us temporarily and in his hands is now the charge of all tools and materials and the supervision of all classes. He also controls the hospital library and debates and discussions on current affairs and teaches map reading and other military subjects. Under him we have two R.A.M.C. Lance-Corporals. One with special experience of handicraft in civil life is in charge of indoor occupation, the other, who is a professional gardener, is in charge of all outdoor occupation.

As for the various occupations some are certainly more popular than others. Woodwork and metal work take first place. The number of small articles such as cigarette boxes or regimental badges soldered into ash trays that can be sent home to wife or sweetheart is very great. Wooden toys for the children at Christmas were much appreciated.

Drawing on the whole is unpopular. In restoring confidence to patients it is essential that they should be able to produce quickly something which can stand comparison with the finished product of an expert. It is much easier for the novice to achieve this end in woodwork or metal work than in drawing. Even sign-writing is more popular than drawing and as a result of this work all our hospital rooms are properly labelled. The letters are made to exact measurement with set square and ruler in an elementary class and the results appear to be anything but the work of novices. The Technical Instructors speak highly of the intelligence of our neurotic patients and find them on the whole more interesting and progressive pupils than their civilian adolescents. They all agree that whatever their artistic sense they learn the technique of a craft at an astonishing rate.

The discovery of unsuspected ability in metal work and woodwork classes has been of great service in subsequent disposal of cases, e.g. an aircraftsman, a milkman in civil life, suffering from an hysterical aphonia, expressed great unhappiness at being in a Balloon Barrage unit. He showed extraordinary ability, which he had not suspected he had, with his hands at metal work and on the strength of this he was recommended for training in a skilled trade and made a successful readjustment.

Physical training, gardening, ground maintenance and the heavy work involved in digging and draining slit trenches is not generally popular but

each man has to take his part and sinks his personality in the common welfare of the hospital as a whole.

Football and baseball and cricket have their skilled exponents and supporters and, for those who cannot get interested in team games, there are para-military exercises such as cordon breaking and the rounding up of paratroops, etc., in which Officer and N.C.O. patients can play their proper role, teaching the men field craft and giving opportunity for display of initiative and ingenuity. These exercises are very popular and inculcate military morale without the tedium of barrack square drill.

DAILY ROUTINE.

Our aim is to have each patient as fully occupied from the time he gets up until after tea as he would be if on full duty with his unit.

Our time table is roughly as follows:—

6.30 a.m.	Reveille; wash and shave and clean wards.
7.30 „	Breakfast.
8.30 „	M.O.'s round.
9.00 „	P.T. class.
9.30 „	Break for light refreshments.
10.00—12.00	Occupation in day rooms, woodwork, rug making, etc., or, alternatively, out of doors, gardening, ground maintenance, trenching, etc. On Monday and Thursday woodwork instructor attends; on Saturday the drawing master. On Tuesday, Wednesday and Friday the patients carry on under the N.C.O.s i/c indoor and outdoor activities.
12.00—12.30	Dinner.
2.00—4.0 p.m.	On Mondays and Wednesdays: technical school. On Tuesdays and Thursdays: organized games or para-military exercises. On Fridays: pay parade. On Saturdays: Army Kinema Service presents a film.
4.00	Tea.
5.30— 7.00	Monday: Visit by ladies of Blind Welfare Association to instruct in basket making, rug making and needlework, etc. Tuesday and Thursday: Army lecture.

So that all patients can be occupied at the same time between 10.00—12.00 and 2.00—4.00 daily, wards alternate between outdoor and indoor occupations.

After tea those who have done their full day's work are free for recreation and can enjoy such privileges as they have earned.

We have been also very much indebted to the ladies of the local Overseas League who have organized innumerable parties, whist drives, dances and theatrical performances in which the patients have displayed histrionic skill. Our patients are excellent actors. Although this does not exactly

come under the heading of Occupation Therapy yet it has assisted materially in keeping up the "morale" of our patients.

It will be seen that there is now a great variety in choice of occupation. The choice, however, is not left to the patient but prescribed by the doctors and this very often results in a patient being given a task at which he has no skill in preference to one in which he is good with the express purpose of bringing out in him some new quality and fresh interest.

AN ILLUSTRATIVE CASE.

A fairly typical case in point is that of a W.O.II, aged 44, with twenty years' regular service to his credit who held a responsible clerical post and had been court-martialled and severely reprimanded for "sitting" on official correspondence. On returning to work it was not long before he repeated the same offence. His Commanding Officer sent him to see the area psychiatrist and he was admitted to hospital in a state of agitated depression. He could not concentrate on anything and had severe insomnia. He was not very easy to help with psychotherapy. He had read a good deal about psychoanalysis and did not hold with it.

He was introduced to woodwork, a handicraft at which he was extraordinarily bad because all his life had been devoted to intellectual and devotional pursuits. However this occupation which was so strange to him absorbed his whole interest. He found himself in healthy competition with young soldiers and gradually a whole new field of activity was opened up to him.

He became much more friendly and co-operative. A claustrophobic symptom was revealed and this had first come on when he was listening to a sermon in church and was associated with a moral lapse about which there was exaggerated guilt feeling. He had over-compensated for this by setting himself impossible standards of efficiency. He was now able to accept a good deal of psychotherapeutic help and his treatment was completed by a short course in modern office methods in the local technical school.

Follow-up of his case six months after return to duty says: "He has done excellent work, has not ailed a single day and describes himself as 'completely cured'." He has been promoted to W.O.I.

It is sometimes thought by the lay mind that medical psychologists exist for the sole purpose of making excuses for the delinquencies of neurotic patients and that they insist on them being given a free hand in the expression of their perverse personalities.

That is not our conception of the role of the psychotherapist. In civil practice the oddity, as a result of psychotherapy, becomes less odd and conforms more to his surroundings. In the Army, if our neurotic patients are to be returned to their units for further useful service, we must evoke, preserve and enhance their military morale.

We found that in the early phases of this scheme when we allowed our patients more or less to please themselves as to which classes they would attend the scheme was not a success. They encouraged each other in lack of co-operation and developed a community atmosphere of Negativism.

We appreciated that the germ of community life had been sown and developed it in a favourable direction by the compulsory system whereby occupations were prescribed just like medicines and had to be taken at precise times.

While every effort is made to induce patients to display their idiosyncrasies, to abreact or air all their personal grievances about the Services in the seclusion of the M.O.'s Office during psychological interviews, any public exhibition of unrestrained emotion, discontent or insubordination in the wards is immediately checked. For example one afternoon at tea time the names of those detailed to attend an Army lecture in the evening were announced. One patient, instead of merely replying to his name when called said, "I blank, blank, am not going to attend any blank, blank, lecture." He was immediately placed on a charge and brought before the Commanding Officer next day. His excuse was that he was suffering from "nerves" and could not help himself. This was not accepted as adequate and he was awarded fourteen days C.B.

Another patient suffering from hysterical contracture of the left hand had been granted compassionate leave. He had wired asking for an extension but this could not be granted. However he took the law into his own hands and returned in his own time. He was dealt with summarily and awarded seven days' detention which he served in spite of his disability. Both these were regular soldiers who had been wounded in France. Both were exhibiting hysterically exaggerated symptoms. Apart from temporary resentment these punishments had a salutary effect not only on them but on all the patients in their wards. They both recovered and returned to duty.

Of course, any patient who cannot really be held responsible for undisciplined behaviour we transfer to the delinquent or psychotic sections.

Neurotics are not pampered in hospital. On the contrary, by a blending of therapy and discipline we endeavour to transform their self-pity into self-respect.

We make it clear to our psychoneurotics that they are in much the same position as they would be if undergoing psychotherapy in civil life. The civilian attending a psychotherapist is induced to abreact during each interview with the physician but in the intervals he has to conform to social conventions.

We like to avoid punishments in dealing with neurotics in hospital but do not hesitate to award them when faced with gross breaches of military discipline even if it means that an individual has to suffer for the sake of the hospital atmosphere as a whole.

Our main aim, however, is by judicious use of a graduated scale of privileges, by group occupational therapy and individual psychotherapy, to encourage patients through the various phases of readjustment until they have reached the stage where they are fit for duty again both mentally and physically.

SUMMARY.

(1) It is pointed out that there was no special provision made for the supply of Occupational Therapy materials or for the employment of a trained Occupational Therapist in Military Hospitals.

(2) The various expedients adopted in establishing an Occupational Therapy department are described.

(3) The importance of compulsion is stressed.

(4) Hospitalization must not be an escape from military routine. Military discipline and morale can be maintained best in a hospital of this type by a system of rewards and privileges for good behaviour and freedom from neurotic symptoms.

(5) In special hospitals where neurotics are segregated it is essential to have properly organized Occupational Therapy in addition to individual psychotherapy if rehabilitation to the community life of the Services is to be achieved quickly.

THE "PHENOL AND CAMPHOR" TREATMENT OF RINGWORM OF THE GLABROUS SKIN. AN INTERIM REPORT.

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Royal Army Medical Corps.

BEING an Army Medical Officer, and being impressed by the numerous cases of ringworm of the glabrous skin seen on sick parades, I resolved to test the "phenol and camphor" method of treatment [1].

Incidence of Cases.—The two main types of ringworm treated in this series were tinea cruris and tinea pedis. Tinea must be fairly widespread throughout the Service. The number of men treated to date amounts to 62 of whom 50 have been discharged as cured; the remaining 12 are the present in-patients. The total figure was made of 47 cases of T. pedis and 15 of T. cruris. One case of erythrasma and one case of ectothrix ringworm have also been treated.

Diagnosis in every case was checked microscopically but, owing to lack of facilities, it was impossible to culture on Sabouraud's medium. Of the 15 cases of T. cruris 8 had recognizable T. pedis running concurrently—the latter always being moderate in degree.

Preparation of Lotion.—The lotion used consisted of a "fifty-fifty" mixture of phenol and camphor prepared by melting a known volume of pure phenol, pouring it into a mortar, adding the proportionate amount of pure camphor and rubbing up the mixture until liquid.

Method of Application.—The lotion is most economically applied with a camel hair brush.

The skin must be dry; otherwise the phenol is liberated from its union with the camphor and burning occurs.

It is not necessary to dry with spirit—swabbing with cotton-wool is sufficient. Dressings, strapping and waterproof coverings are best avoided as they retain sweat. An exception to this rule is seen in those cases of T. cruris in which the scrotum is unaffected. Here a home made suspensory bandage can be utilized to protect the delicate scrotal skin.

Applications to healthy skin are symptomless. A certain amount of smarting appears usual during applications to patches of T. cruris though it is rarely intense and seldom lasts more than fifteen minutes. It is much less common in T. pedis. The more intense the infection, the larger the infected area, the more fissured the skin, the greater the smarting. Infected scrotal skin is most delicate in this respect but appears to be rid of infection most rapidly of all. Contact of serum or pus with the lotion does not appear to promote burning.

Tinea of the glabrous skin appears to be associated especially with excessive sweating. Consequently a rule was made that for half an hour

after applications the affected part should be exposed to the air without a covering of bedclothes, etc.

Treatment.—Intelligent nursing is definitely a requisite of rapid cure. Phenol is a substance which must be used with great care and discretion and the nursing staff must be fully trained in the detail of its use.

With these requisites in view, and remembering that rest is a first principle in the treatment of all inflammations, the routine used was to admit patients and treat them as bed cases—allowed to get up for bowel motions, etc., only.

The impression gained was that four applications a day produced a sufficiently constant high concentration of phenol for progress to be maintained at the optimum rate.

The danger of more frequent applications lies in the formation of small indolent-looking ulcers. These however heal in two or three days when covered by a strip of elastoplast and left undisturbed.

In the case of *T. cruris* it is advisable to apply the lotion first to the healthy skin beyond the periphery of the patch and then to work inwards. With such a technique there is less likelihood of missing a small portion of the growing edge as a result of hurried treatment.

The lotion causes the affected skin to flake—at first as a branny desquamation and later in flakes of increasing size.

These should be removed with ol. arachis or zinc cream, both of which have a beneficial effect on the smarting. In *T. pedis* the moist interdigital skin dries and should be peeled off so that each application subsequently is applied nearer to the zone of active infection and not to the covering umbrella of thick moist skin. The lotion is rubbed well in with the brush and the crusts are removed as far as possible without bleeding in chronic cases.

As would be expected the outermost cleft is the most stubborn and the others are (in general) healed a few days before it.

Results.—There have been no recurrences among the 15 cases of *T. cruris* discharged. Two cases of *T. pedis* have recurred mildly in the outermost digital cleft only but have cleared up as a result of subsequent treatment. It appears probable that these were discharged originally before absolute cure was obtained. The remaining patients show no signs of recurrence.

It is remarkable to note that as a result of treatment the infected portion is completely replaced by normal healthy epidermis and there is no scarring.

Cases of *T. cruris* received, on an average, 3.5 days of treatment with phenol and camphor; cases of *T. pedis* averaged 5.76 days' treatment.

The faster healing of *T. cruris* is probably an expression of the fact that infection is less deep-lying. Cases were not discharged until all traces of thick opaque skin had disappeared or, in cases of *T. cruris*, the scales produced in healing had fallen off leaving a homogeneously smooth,

non-spreading, non-irritating surface. The cost of treatment averaged 3d. per case. Bulk purchasing would undoubtedly reduce this even further.

Case 1.—One of the worst cases treated was that of W. H., a 33 year old man, who first contracted *T. pedis* at the age of 10. He had a very severe chronic bilateral infection extending over the soles of his feet and over the anterior aspect of the ankle-joints from between his toes. He had spent at least one-third of his Army career in various hospitals receiving treatment with Whitfield's ointment, etc. Owing to the condition of his feet he had been excused marching, P.T. and gun-drill throughout his two years' service. After thirty days' treatment he was discharged on August 7, 1942, with normal skin on his feet for the first time in twenty-three years. To date (September 27, 1942) after seven weeks of full duties including route marches, P.T., etc., he has no trace of recurrence.

Case 2.—C. R. C. was afflicted with bilateral *T. cruris* plus extension to both axillæ. Four patches (the minimum the size of a half-crown piece) extended from the level of his left knee to the dorsum of the foot and three patches of similar size were present on his right thigh. The fourth and third interdigital clefts of both feet showed moderate *T. pedis*. This was as intense and as widespread an infection as I have ever seen. The primary patch on the right thigh was 13 by 10½ inches—that on the left side was but little smaller. The armpits were almost completely affected. But after seven days' active treatment, with two subsequent days of observation, he was returned cured to his unit. He has had no further trouble.

Case 3.—Is quoted for its general interest and for the implied extension of the phenol and camphor treatment to cases of tinea other than that of the glabrous skin. R. J. W. was admitted on August 31, 1942, suffering from a well-developed kerion celsi (ectothrix), 65 mm. in diameter, situated in the left posterior triangle of the neck. Applications of cataplasma kaolin co followed by pasta mag. sulph. succeeded in inducing a free flow of pus from numerous follicular openings. Lotio phenol and camphor was then applied three times daily (kaolin and mag. sulph. being stopped). Within the first twenty-four hours all purulent discharge had cleared and the surface of the kerion celsi was dry and crusted. With subsequent applications the crusts became removable and the neck returned to its normal state. No burning occurred.

No toxic renal effects were observed throughout the series.

Conclusions.—There is reason to believe that ringworm of the glabrous skin is prevalent.

In trained hands lotio phenol and camphor appears to be a rapid, certain and cheap cure.

Certain details of treatment still remain to be worked out more fully.

A new field of investigation has been opened into the treatment of "dermatitis due to fungi."

I am indebted to Colonel James Rannie, *T.D.*, for his interest and encouragement; to Colonel W. B. Laird, for permission to publish these notes; and to Corporal I. I. Nelms, *R.A.M.C.*, and the remainder of my staff for their intelligent and enthusiastic co-operation in treatment.

My thanks go to my wife for her ready assistance in unravelling statistics and in compiling this report.

Editorial.

PREVENTION OF VENEREAL DISEASE IN THE ARMY.

APART from battle casualties venereal disease represents one of the major causes of invalidity amongst soldiers, more particularly in the various stations and theatres of war overseas. Venereal disease can very largely be prevented and, if a really active policy is pursued, will be prevented. So far as venereal disease in a Force is a medical problem, and its prevention is by no means entirely a medical matter, responsibility rests with the D.M.S. who has on his staff a consultant or adviser in venereology who advises him, and a D.D.H. who functions on the executive side. Ultimately, of course, responsibility rests with the G.O.C. and down the chain of command to Os.C. units; the M.O. of any unit is adviser of the O.C., and much will depend on the advice which he gives and how it is implemented. One of the most important points to remember, and one often forgotten, is that the venereal disease rate amongst troops is usually proportional to the venereal disease rate in the local civilian population. The first active step, therefore, is to establish a close liaison with the civilian health authorities and, if necessary, put pressure on them to deal with infected civilians by such measures as closure of brothels, rehabilitation of prostitutes, tracing of contacts and the provision of adequate free treatment for all.

Venereal disease is almost invariably the result of promiscuity and young men living a communal life tend towards promiscuity unless their energies are directed into other and more desirable channels; this is more evident overseas than at home and more particularly in the East where soldiers are subject to the temptations of cafés, brothels, prostitutes, pimps and the like. The more important factors leading to promiscuity are, in the following order of importance, alcohol, lack of decent feminine society, more or less intimate contact with ladies of easy virtue as in solicitation, kissing, petting, etc., and boredom; additional ones are a sense of well-being arising from physical fitness, the idea that sexual intercourse is necessary for health, the influence of bad companions, fear of impotence and reaction following the strain and stress of active operations.

Any campaign against venereal disease must therefore take all these factors into consideration if the maximum success is to be attained. Of the active measures to be taken *education* comes easily first; it is amazing how ignorant the average layman is of venereal disease and this does not apply only to those who have had but an elementary education; many educated people still believe that gonorrhœa is contracted from lavatory seats and syphilis from cups, glasses, spoons and forks! Education should

include lectures, not only to the troops but to combatant officers and N.C.O.s, films and broadcasts. A small pamphlet on how to lecture is issued to all medical officers indicating the lines on which they should give their talks. Next to education comes discipline and all that it involves; there is no shadow of doubt that the venereal disease rate is always higher in an undisciplined unit and if the soldier knows that the contraction of venereal disease involves unpopularity and means letting his unit down, to say nothing of lowering its morale, he will think twice before running a risk.

Something like 60 per cent of all soldiers who contract venereal disease admit being more or less under the influence of alcohol at the relevant time; this drug clouds a man's judgment and removes inhibitions leading to the committing of acts which would never be performed in his more sober moments; the wines of the country are often very potent and those who imbibe them are little used to their effects. The man who is bored is more likely to succumb to temptation than the one who is fully occupied; every effort should be made to provide occupation for the men's spare time in the form of sports, games, cinemas, concerts, etc.; this is largely a matter for the Welfare Department but regimental officers can do much in their own spheres.

Having taught the soldier the necessity for continence, the dangers of promiscuity, what venereal disease is and what it may lead to, there remain the more positive measures which can be employed in those cases where, none the less, men will indulge. In general the policy is to encourage early personal disinfection *after* a possible risk. Overseas, condoms are provided free but they are neither issued nor forced upon the men. It has been claimed that the provision or issue of condoms encourages fornication but abroad, where most infections are from prostitutes, the question of birth control does not arise and it is felt that their value outweighs their disadvantages; they are not provided officially at home. Personal disinfection, particularly if carried out under skilled supervision and soon after an exposure, will prevent the development of gonorrhœa or syphilis in the vast majority of cases; its efficacy depends on the thoroughness with which it is carried out and how soon it is applied—every minute's delay matters. Preventive packets are available everywhere and instructions as to their use are enclosed; personal disinfection may be carried out in a P.A. room which should be established in every unit but is more satisfactorily performed in a P.A. centre staffed by trained orderlies.

Brothels are not a problem at home but they constitute a very serious one almost everywhere overseas. Most hygienists advocate their closure or the putting of them "out of bounds" but these solutions are not so simple as they appear. Closure of brothels means throwing their inmates on the streets unless measures are adopted for their rehabilitation; putting brothels "out of bounds" to troops is usually much more practicable and should be done wherever possible but in certain places this would mean

denying troops entry to those areas where there are shops, places of entertainment, etc., in other words virtually confining them to barracks or camps. Where such conditions prevail much may be done by the Military Police and a specially selected N.C.O. should be appointed to track down known infected women and bring them under treatment.

From the foregoing it will be seen that the problem is extremely involved and no single measure likely to be effective. It is only by a combination of measures adjusted to meet the needs of the situation of the particular area that effective action can be taken to reduce the incidence of venereal disease. The problem is much more serious overseas than at home and for this reason overseas conditions have been mostly considered. There we have a comparatively free hand but at home policy has always to be framed with a view to the objections which may be raised by moralists, many of whose strictures are founded on incomplete knowledge of the facts; the Army authorities have many times been accused of encouraging vice by "giving systematic instruction to all recruits in the prophylaxis of venereal disease." This expression can bear various interpretations but we certainly do not take the recruit directly he joins and teach him how he may fornicate in safety; what he is told is to "be good" and, if he can't be good, "be careful," i.e., carry out adequate personal disinfection immediately after exposure.

It has been truly said that the prevention of venereal disease is a moral problem with a medical side; it is only by attacking it from both directions that the best possible results will be achieved. Education and the maintenance of a high standard of both morals and morale represent the strategy and the elimination of infected persons and personal disinfection the tactics of the anti-venereal campaign.

Clinical and other Notes.

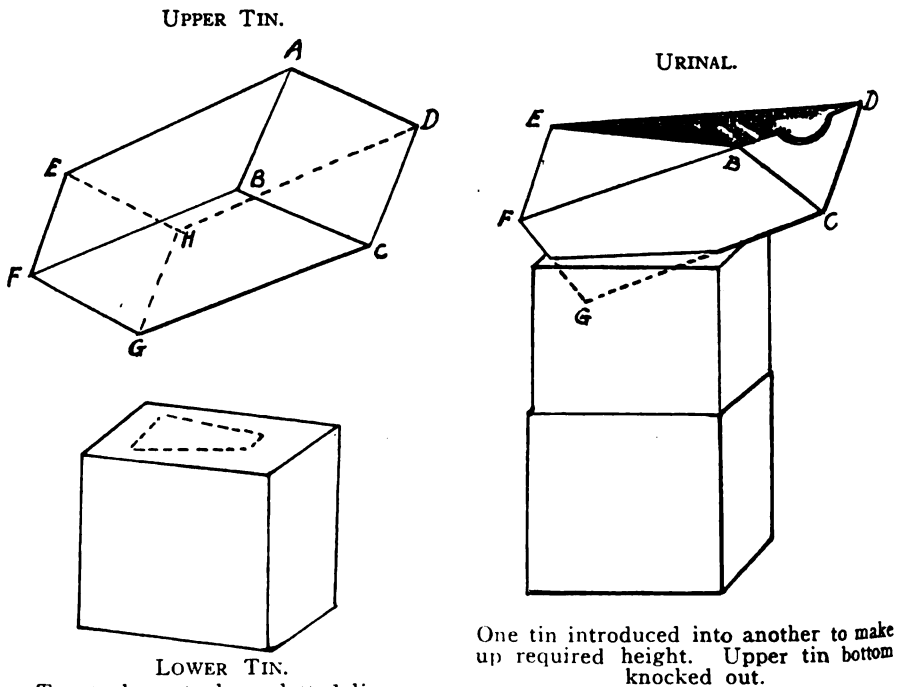
URINALS.

By H. J. M. C.

OWING to vagaries of present transport conditions the January, 1942, number of the Journal, No. 1, vol. lxxviii, has just been received.

In the article "Hygiene with a Force," whether a two gallon petrol tin or a four gallon kerosine tin is used and the way the upper tin for the urinal is cut is not quite clear in the text on page 31 or illustration on page 32.

A four gallon kerosine tin cut in the following manner serves the purpose



Top to be cut along dotted lines.
Bottom intact if required as receptacle.

of a funnel admirably and has been used in various parts where the Army has served since 1918. A small model of it was placed in the Hygiene Museum, Millbank, in 1931. I do not suppose it is there now. It has not been described in any of the official War Office Hygiene or Sanitation manuals. It has functioned so well and it is so easy to construct that I make bold to send you a detailed description and a rough sketch.

A two gallon petrol tin would function equally well but not as well as a four gallon kerosine tin.

(i) Cut the top of the tin diagonally across from B to D leaving the handle attached if possible (see sketch).

(ii) Cut one side diagonally from E to B.

(iii) Cut the adjacent side diagonally from E to D.

(iv) Discard the triangular piece of tin cut off.

(v) Perforate the corner at "G" with small holes from within outwards with an average sized nail or point of a bayonet or kukri.

(vi) Place this tin at an inclined angle on the lower tin, the bottom of which is complete if required as a receptable for the urine, or knocked out if required to be placed over a soak pit or introduced into another tin in order to increase the height of the urinal to a more convenient level. The top tin must be anchored to the bottom by wire in localities subject to storms and wind.

Paint the outside of the tin with white wash; the inside of the tins, especially the topmost one, with black crude oil in order to preserve the inside from rusting as well as to serve as a better target at night.

The whole thing can be constructed by any individual with a clasp knife, bayonet or kukri and needs no tinsmith or other expert artisan.

A DEVICE TO REPLACE THE WALKING IRON IN PLASTER CASES.

BY LIEUTENANT-COLONEL J. LAWSON,

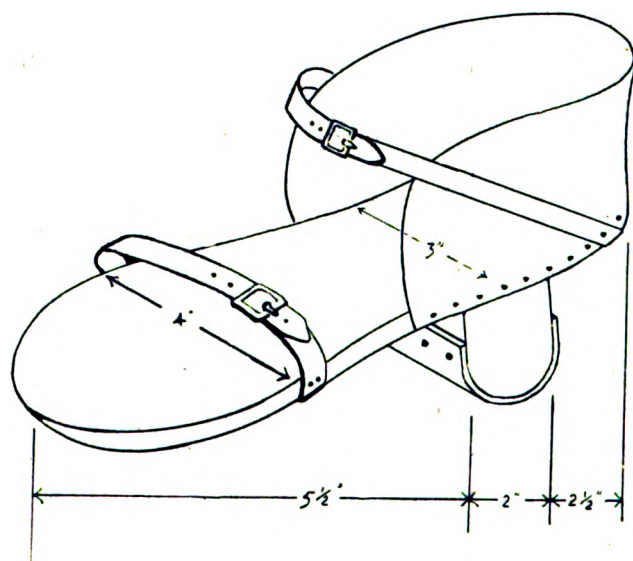
Royal Army Medical Corps.

THE experience which has been gained in dealing with a large number of soldiers fitted with lower limb plasters and walking irons has shown that the Bohler walking iron is in the majority of Service cases unsatisfactory. The chief drawbacks are the bending sideways of the projecting portion, the fracture of the iron at the point where it is drilled and the damage which it is apt to do to bedding. It may be that the first two objections are more often seen in Service patients who are on their feet more and rest less than civil patients and who are required to do a form of physical training which, although specially designed for them, is quite energetic.

Various alternatives to the Bohler iron have been tried out. For example, a simple plaster heel has been used and, while satisfactory in wards, wears down much too quickly on pavements or when subjected to water as on muddy ground. A wooden heel fixed with plaster bandages is more satisfactory but leaves the front sole of the plaster exposed to wet and is apt to work loose while, if the sole of the plaster is at all yielding, the pressure exerted may be too localized. A wooden sole with wooden heel affixed

with plaster bandages has also been used but in all these alternatives the patient has to take his "muddy boot" to bed with him.

The device now adopted is a wooden sole and heel which can be detached at night. This "sabot" can be made from scrap materials by a semi-skilled carpenter. The sole is 9, 10 or 11 inches long, 4 to $4\frac{1}{2}$ inches wide at the base of the toes, tapering to 3 to $3\frac{1}{2}$ inches at the heel. It is of $\frac{1}{2}$ inch wood bevelled at the toe. The heel is a 2-inch cube fixed with screw nails. It is slightly rounded on the walking surface and, when possible, tipped with rubber. A short "upper" made of tin or other stiff material is nailed to the rear portion of the sole. The sabot is retained in position by a strap across the front of the plaster behind the toes and a second strap



from the heel forwards across the front of the ankle. This latter strap retains the upper in position.

In cases in which it is intended to use the sabot the plaster sole should be made flat without an inclination to either side so that the sole fits snugly and without tilting. The patient wears a sock over the plaster beneath the sabot.

The men fitted with this sabot walk easily, do not notice the slight additional weight and, in most cases, prefer it to any other walking device.

The use of wood in constructing the sabot results in rather a clumsy appearance which, if light metals such as duralamin were available, would be obviated.

The drawing gives an idea of the type of article aimed at but modifications continue to be made in the light of experience and depending on the materials available.

CASE OF A GUNSHOT WOUND OF STOMACH AND DUODENUM
WITH RECOVERY.

BY CAPTAIN W. J. C. CRISP,

Royal Army Medical Corps.

PRIVATE C. age 27 was accidentally shot by a bullet from a .45 Service revolver at a distance of 4 feet on December 23, 1942, at 6.55 a.m. and admitted to a Field Hospital at 8 a.m.

When examined he was in great pain and had vomited black fluid several times. The bullet entrance wound was 3 inches above the umbilicus. There was no exit wound and the bullet was felt under the skin of the back to the left of the 4th lumbar vertebra. There was marked rigidity and tenderness of the abdomen. B.P. 100 systolic. Pulse 100. Respirations shallow and costal. A pre-operative diagnosis of perforating wound of the stomach was made. He was given morphia gr. $\frac{1}{4}$ and atropine gr. $\frac{1}{100}$ and preparations made for immediate operation.

At 9.45 a.m. operation was commenced. The abdomen was opened by a left paramedian incision and the entrance wound excised. Blood gushed out and this was seen to arise from a wound of the mesentery of the small intestine. Bleeding which was coming from a large mesenteric vein was stopped by grasping the root of the mesentery between the fingers. The vein was ligated and blood cleaned out of the peritoneal cavity. The bullet, which had perforated (1) the stomach close to the greater curvature; (2) the transverse mesocolon; (3) the root of the mesentery of the small intestine; and (4) the third part of the duodenum close to the duodeno-jejunal junction, had finally left the abdominal cavity by piercing the posterior peritoneum close to the left ureter 1 inch to the left of the body of the 4th lumbar vertebra where it had remained. The duodenum and upper 2 feet of the jejunum were dilated and their walls engorged with blood. The duodenal perforations were sewn up in two layers and the holes in the mesocolon and mesentery of the small intestine closed. The anterior hole in the stomach was sewn in two layers after trimming the edges. The posterior hole in the stomach was approached by incising the gastro-colic omentum and then sutured. The abdomen was closed without drainage. During the operation the B.P. fell to 70 mm. systolic and two pints of serum were given and later one pint of blood.

After operation the patient was put in Fowler's position, and continuous intravenous drip saline was given for five days. A duodenal tube was passed nasally to keep the duodenum and stomach empty. This was kept *in situ* for three days and fluid was withdrawn every half hour. M & B 693, $\frac{1}{2}$ gm., three times a day, was given. Twelve hours after operation the B.P. was 115 systolic. Except for a rigor after saline intravenously he made an uninterrupted recovery and should be fit for service in three months' time. The bullet was removed under local anæsthesia fourteen

days after operation; it was found to be a .45 soft lead type and had evidently hit the left side of the lower border of the 3rd lumbar vertebra.

Comment.—Gunshot wound of the stomach and duodenum is usually fatal from shock and hæmorrhage or, later, from duodenal fistula. This man's recovery may be attributed to: (1) Operation being performed within six hours of the injury. (2) Nothing having been given by mouth for five days and continuous saline given intravenously for the same period. (3) The duodenum being kept empty by continuous aspiration. Thus paralytic ileus and duodenal fistula were not encouraged.

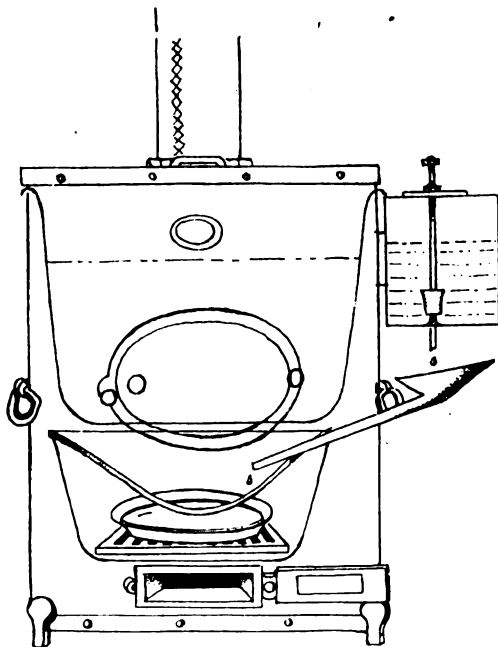
I should like to thank Lieutenant-Colonel J. W. Eames, R.A.M.C., for permission to publish this case.

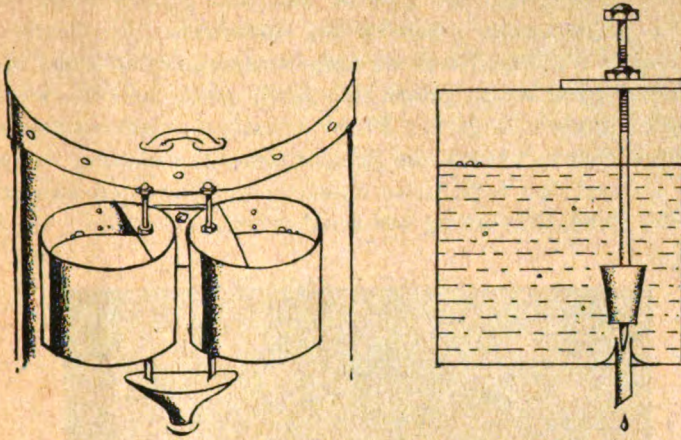
METHOD OF HEATING A SOYER STOVE BY OIL AND WATER FLASH PAN.

BY LIEUTENANT-COLONEL J. L. WARNER,
Royal Army Medical Corps.

THE following method has been devised by Lieutenant F. O. Moore, R.A.M.C., and is in use in this unit.

Two seven-pound jam-tins are fixed together with a piece of scrap metal and a D section of the lid of each is left in position. Into a hole in the bottom of each a piece of $\frac{1}{4}$ inch bore brass tubing $1\frac{1}{2}$ inch long is soldered





A skewer is attached to a $\frac{1}{4}$ inch bolt and fixed by a $\frac{1}{4}$ inch nut to the D of the lid so that the point of the skewer can be screwed into the brass tubing.

A cork is placed on the skewer to close the tubing when the skewer is screwed down. The two tins are attached to the top of the side of the Soyer by a bolt.

Below the two tins a funnel, made from a four-gallon petrol-tin, with a tube 12 inches long, is inserted through a hole bored in the side of the Soyer so that the end of the tube is above the pan which is placed in the fire-box.

The oil and water are allowed to drip in the ordinary way controlled by the micrometer screws.

Soyers full of water can be boiled in twenty-five minutes.

CALCIUM CARBONATE GALL-STONES.

BY LIEUTENANT-COLONEL E. V. WHITBY,

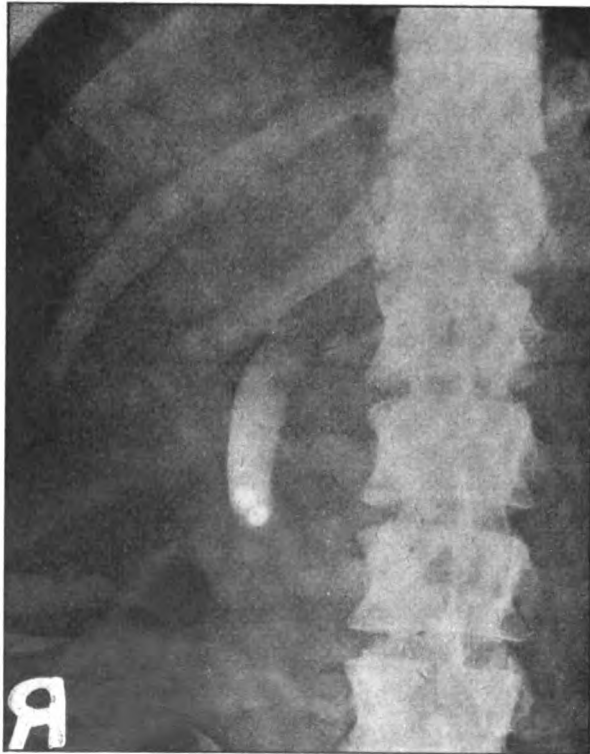
Royal Army Medical Corps.

A SOLDIER, aged 30, was sent to me for a contrast meal examination with the following history:—

Quite well up to six months ago when he had a sudden attack of severe abdominal pain above the navel with diarrhoea. This lasted for about a week. During the next two or three months he was quite clear from any diarrhoea or discomfort. He then had another similar attack which lasted for about the same time. A third attack started about a month ago when the diarrhoea was more severe and the character of the pain changed from being sharp to that of an ache. He complained of these symptoms up to the time of the examination. There has been no pain or discomfort related

to meals, no jaundice, and his appetite has been good except during the attacks. The predominant symptom was diarrhoea. No history of previous illness apart from an attack of amoebic dysentery in India in 1935.

At the radiological investigation two small dense opacities were seen in the right hypochondriac region. These appeared to have smooth borders and a structure that exhibited fine linear markings radiating outwards. A lateral view showed that both these opacities were situated anteriorly, well in front of the spine, thus ruling out renal origin.



Cholecystograms.—P—A and lateral views demonstrated these opacities in the gall-bladder. In a straight film the upper opacity proved to be a gall-stone in the cystic duct for, at operation, one of the gall-stones was found to have returned to this position.

A laboratory report on one of these calculi read as follows:—

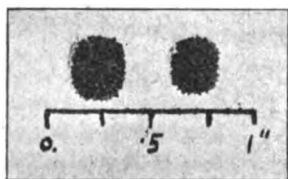
Physical Examination.—Size 6 mm. by 5 mm., roughly an oblong spheroid, olive-green, thickly covered with tiny sharp spicules. Weight 150 mg. Volume 1 c.c. On section the spicules appear to extend half-way to the centre of the stone. No lamination was observed. The stone was easily crushed.

Chemical Examination.—Calcium salts accounted for 83.2 per cent of

the weight of the stone. Of these salts, 98 per cent consisted of calcium carbonate, 2 per cent of calcium phosphates. No cholesterol was found and, though the stone was obviously stained with bile, bilirubin could not be detected chemically. The remaining 16.8 per cent of the weight of the stone consisted presumably of water and traces of organic matter.

Gall-stones composed almost entirely of calcium salts are supposed to be very uncommon.

Peter Kerley in the Textbook of X-ray Diagnosis by British Authors



states: "Occasionally gall-stones are seen which may be composed of about 90 per cent calcium carbonate and 10 per cent cholesterol. These stones are of two types, white and green. The white ones are soft and associated with obstruction of the cystic duct, the green ones contain copper in addition to calcium carbonate, and are associated with general metabolic disturbance. Calcium carbonate stones are rare. They are usually single and round or barrel-shaped."

I am indebted to Dr. J. M. L. Burtenshaw of the Staffordshire Bacteriological and Pathological Laboratory for the laboratory report.

Current Literature.

HUANG, Y. W., SHEN, T. H. & TANG, F. F. **A Note on the Re-Utilization of Used Agar-Agar as an Emergency Culture Medium.** *Chinese M. J.* 1941, Feb., v. 59, No. 2, 176-8. [Summary appears also in *Tropical Diseases Bulletin*.]

Agar-agar is an extract of the seaweed *Gelidium corneum* and under present circumstances it is not easy to obtain supplies. The authors have experimented to find out whether it could not be used more than once. Their investigations led them to conclude that poor growths or failure of bacteria to grow on used medium sterilized were due not so much to lack of growth-promoting material as to inhibiting substances left over from previous cultivation. They therefore cut the used and resolidified agar into thin slices, placed them in covered bamboo baskets and the baskets into a running stream for twenty-four to forty-eight hours, for thorough washing. Better results were thereby obtained, but repeated autoclaving—14 or 15 pounds pressure sterilizations—gradually removes the property of solidifying on

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MESSAGE FROM HER MAJESTY THE QUEEN,
COLONEL-IN-CHIEF, ROYAL ARMY MEDICAL CORPS.

THE Director-General, Army Medical Services, who sent the telegram given below to our Colonel-in-Chief, has received the following gracious message from Her Majesty The Queen.

The Director-General,
Army Medical Services.

My sincere thanks to all ranks for their loyal message on my birthday, which I have received with much pleasure.

ELIZABETH R., Colonel-in-Chief,
Buckingham Palace.

The Private Secretary to Her Majesty The Queen,
Buckingham Palace.

Colonels Commandant and all ranks, Royal Army Medical Corps, submit their most respectful greetings to their Colonel-in-Chief on her birthday.

The Director-General,
Army Medical Services.

Authors are alone responsible for the statements
made and the opinions expressed in their papers.

Journal of the Royal Army Medical Corps.

Original Communications.

A CASE SHOWING UNUSUAL EFFECTS OF TRAUMA.

BY MAJOR J. V. WILSON,

Royal Army Medical Corps.

THE following case is reported as being of interest on account of the multiplicity and nature of the internal injuries resulting from trauma without at the same time any extensive external injury.

Medical History.—The patient was a naval rating aged 21 years and gave no previous history of injury. There was no previous illness of note. When on patrol, his ship struck a mine and he received a superficial wound about $\frac{3}{4}$ inch long on the forehead just above the root of the nose caused by a small splinter from the mine. There was no definite statement that he either fell or was thrown against the ship's structures on this occasion and the only visible injury he received was the one on the forehead. There was no evidence of cranial injury and after examination by the medical officer he was allowed full liberty on his ship and was doing light duty.

Two days later at 1320 hours he was swinging across a hold on a chain which gave way and he fell down the hatch from the Sick Bay flat to the stokers' mess deck, striking the back of his head. The hatch consisted of two flights of steps at an angle to each other, the total distance between the decks being about 10 feet. This fall was broken at the end of the first flight and from thence he more or less rolled downward to the deck below. Examination immediately after this second accident showed that there was a fairly large hæmatoma present and a contused wound about 1 inch long over occiput almost directly in line with the wound on the forehead he had received two days previously. He was dazed but not unconscious. His pupils were equal and circular and reacted to light and there was no evidence whatever of intracranial injury. An acriflavine dressing was applied and he was sent to bed. At this time (1515 hours) he had reached port and owing to an air raid warning was taken on shore on a stretcher to a shelter and back on board, about one hour later, to his bunk. He had been carefully moved and remained on the stretcher during the whole operation, never being allowed to move about or stand up. At 1700 hours he began

to complain of headache and nausea and was re-examined by another medical officer. His temperature was 98.2° F., pulse-rate 70, full and bounding. There was no evidence of intracranial injury and soon afterwards he fell into a natural sleep. At 1805 hours he was again examined and, apart from being rather drowsy, which was attributed to his having been asleep, no evidence of an intracranial lesion was detected. However, just as the medical officer was about to leave the bunk, the patient produced an epileptiform convulsion which lasted for about one minute. It commenced with general clonic movements and patient was unconscious for about five minutes. Injury to the tongue was prevented by immediate action on the part of the medical officer and there was no involuntary voiding of fæces and urine. He vomited on regaining consciousness, the pulse-rate rose to 106 and he began to sweat profusely. The pupils were at first fixed but later, although equal, reacted sluggishly to light. He was then transferred to a military hospital where he was admitted to a surgical ward.

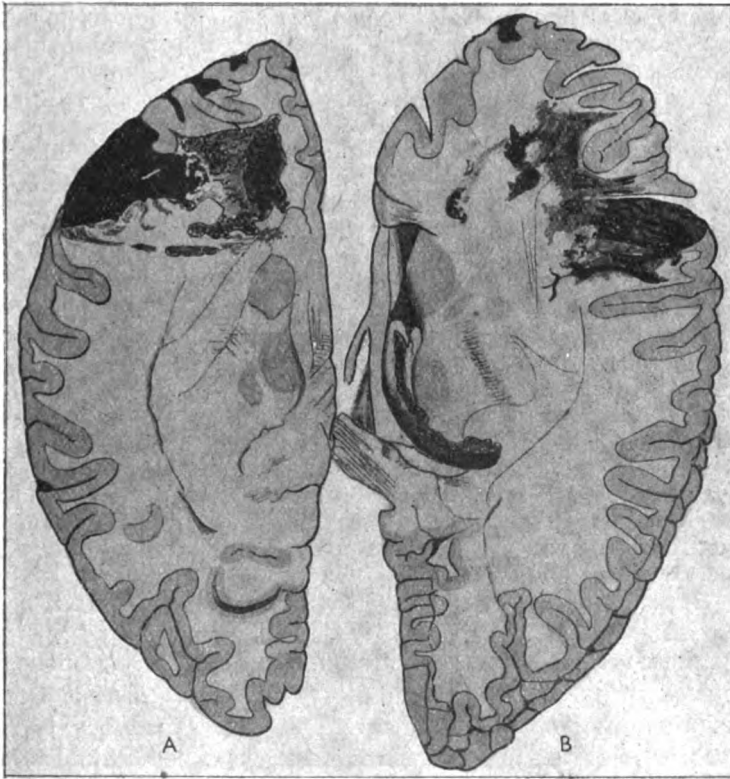
On admission to hospital the patient was drowsy and could only answer questions with difficulty and his reaction was very slow. The pulse-rate was 48 and irregular and the temperature was normal. The contused wound over occiput and superficial abrasion over forehead were noted but there were still no definite physical signs of intracranial injury. There were no abnormal findings in the cardiovascular, respiratory or abdominal systems. A lumbar puncture was performed and about 5 c.c. of blood-stained fluid were removed and sent for examination. The blood was evenly distributed throughout the fluid and the cells were fresh. After the lumbar puncture patient became much more rational and regained complete consciousness. At 2200 hours he again became restless and lapsed into unconsciousness from which he could not be roused. His pulse-rate was 50 and irregular, the breathing stertorous and slow. On examination of the nervous system there was a flaccid paralysis of the left side of the body, the abdominal reflexes were absent, knee-jerks increased and the left plantar response was extensor in type. Major Evans, R.A.M.C., medical specialist, saw the case in consultation and made the diagnosis of hæmorrhage of the right frontal region and advised surgical intervention with a view to relieving intracranial pressure. The skull was trephined by Surgeon-Commander Long, R.N. No extradural hæmorrhage was seen but the dura itself was under extreme tension due to blood in the subdural space. After operation his general condition improved but he never regained consciousness and died suddenly five hours later.

Post-mortem Examination.—The body was that of a well-developed male of average nutrition. His height was 5 feet 10 inches and weight 10 stones 9 pounds. There was a small superficial cut over forehead and a large hæmatoma with a laceration about 1 inch long over the occiput. There was no other evidence of external injury.

Thoracic Cavity.—There had been no injury to the tongue or obstruction of larynx. The mediastinum was normal and there was no evidence of injury to either ribs or parietal pleura. There was about 75 c.c. of slightly blood-stained fluid in both pleural spaces. The lungs were congested and there were small areas of subpleural hæmorrhage scattered over the posterior surface of both lungs and over the anterior surface of the left lower lobe. On section the whole of both lungs was hæmorrhagic throughout, the deeper hæmorrhages communicating with the subpleural markings. There was slight œdema present but no evidence of pneumonic consolidation. The right lung weighed 657 grammes and the left 602 grammes. The trachea and bronchi were normal and there was no evidence of

hæmorrhagic exudate. The pericardium was normal and the pericardial fluid was normal in both amount and appearance. The heart was of normal size and weight. The superficial surface of the whole anterior wall of both right and left ventricles and the whole lateral and posterior surface of the left ventricle was the seat of congestion and ecchymosis. On opening up the chambers of the heart it was seen that the injury to the muscle was superficial throughout, the hæmorrhage extending uniformly over the ventricular surface to a depth of about 1 mm. The heart valves were all normal. The coronary arteries and the aorta showed no pathological change.

Abdomen and Pelvic Cavity.—The peritoneal space was normal and con-



Cross-section of right cerebral hemisphere representing site of hæmorrhage. Note the multiple sites of origin and rupture externally.

tained no excess fluid. The liver was slightly enlarged but was firm and surface was smooth. The spleen was normal. The mucous membrane of the stomach wall was thicker than normal and there was excess mucus present but otherwise the alimentary tract was normal. The suprarenals and kidneys and pelvic organs were normal.

Skull and C.N.S.—There was a hæmatoma over the occiput the diameter of which was about the size of a five-shilling piece. The skull itself was intact apart from the trephine opening over the right frontal region. On opening the brain the dura was dark and bulging and the surface of both

cerebral hemispheres were covered with blood clot. There was a small clot at the base of the brain but most of the hæmorrhage was over the vertex and appeared to come from the deeper substance of the brain through a rupture of the right frontal cortex. There was some depression of the cerebral convolutions. The vessels at the base of the brain appeared normal and there was no evidence of aneurysm. After fixation the brain was examined and on section it was found that there was a large hæmorrhage in the substance of the right frontal lobe anterior to the lateral ventricle and coming to the surface about 2 inches from the anterior pole of the frontal lobe and thence reaching the subarachnoid space. There was no rupture into the ventricle. The hæmorrhage was multiple in origin (*see diagram*), coming from small vessels in an area in the frontal lobe extending for a width of about 3 inches from the thalamus medially almost to the cortex laterally. A very careful search of the blood clot and its surroundings was made but there was no evidence whatever of an aneurysmal sac and naked-eye appearances did not suggest the presence of a glioma.

Histological Findings.—Microscopical examination of the lungs showed generalized hæmorrhages throughout both lungs. The capillaries were congested throughout and the alveoli contained red blood cells in a fibrinous mesh. There was a slight infiltration of mononuclear cells but no evidence of inflammatory reaction. Some alveoli contained œdematous fluid and some were ruptured.

The myocardium of the contused area of the ventricular wall showed superficial hæmorrhages into the musculature with occasional tearing of the muscle fibres and rupture of the sub-pericardial vessels. There was some round-celled infiltration but no evidence of fibrosis. The deeper musculature was quite normal.

Histological examination of the vascular system of the base of the brain failed to reveal anything abnormal in the structure of these vessels. There was no evidence of defects of their walls either along their course or at the point of origin of their branches. Sections from the brain tissue of the hæmorrhagic area merely showed disorganized cerebral tissue mixed with recently extravasated blood. The vessels round about were congested but the walls were intact and of normal structure.

DISCUSSION.

This patient received direct injury on two separate occasions. When his ship struck a mine he received an injury on the forehead and may have been thrown against the ship's structure. Two days later he was swinging on a chain with his back to a hatch when the chain became unfastened and he fell backwards. He hit the end of the first flight of stairs five feet below with the back of his head and possibly shoulder and thence rolled downwards another five feet on to the deck. Neither could be called major injuries and the total external evidence of trauma was a cut on the forehead and a hæmatoma over the occiput. There were no marks or bruises over his chest or abdomen and all bones were intact. He was also subjected to the blast from the mine explosion.

The thoracic lesions revealed at post-mortem examination were contusion of the myocardium and pulmonary hæmorrhages scattered widely through both lungs. The thoracic cage itself was intact. These lesions may have been caused by direct chest injury either when the mine exploded and

he could possibly have been thrown against a fixed structure or two days later when he fell down the hatch. The blast from the mine explosion may have been an ætiological factor. It is now well known that direct injury to the chest wall can cause contusion of the heart without injury to the ribs or thorax. These cases of trauma of the heart have been reviewed by Barber and by Anderson and their significance emphasized, whilst Moritz and Atkins have carried out an experimental and pathological study on dogs and report the features which make it possible to differentiate between contusion and infarction and which help us to arrive at some conclusion as to the age of the lesion. The condition has also been reported on by Bright and Beck and by Warburg. On the other hand very little attention has been paid to the importance of blast as a cause of myocardial contusion. We have had the opportunity of studying cases of pure blast where the myocardium has shown naked eye and microscopic evidence of contusion and have pointed out that the cardiac element of blast is of considerable importance (Tunbridge and Wilson, 1942). In one of our cases of blast injury the aorta was ruptured though the chest wall itself was intact (Wilson and Tunbridge, 1942). We can thus state that in this case blast is a possible cause of the cardiac contusion. Further the definite naked eye and microscopic appearances would tend to favour a three-day rather than a more recent origin though too much stress cannot be attached to this. The lung lesions were extensive both macroscopically and microscopically and yet were sub-clinical throughout. Whilst pulmonary hæmorrhages are not pathognomonic of blast still they are the predominant feature and are characterized by being widespread and bilateral. Direct injury does cause lung hæmorrhages but then it is localized to the site of trauma. The histological picture corresponds to that described by Hadfield (1941) as occurring in thirty-six to forty-eight hours after a blast injury, i.e. mononuclear infiltration, fibrin formation in the alveoli and red cells showing signs of breaking up; the picture thus bearing some resemblance to the red hepätization stage of pneumonia. The œdema present may have been cerebral in origin but we have noted its presence in cases of pure blast without obvious cranial lesions. Thus the naked eye and microscopic appearance of the lungs is very suggestive of blast being the cause of the lesion.

Death was finally due to the intracerebral hæmorrhage and it is possible that, but for the onset of this accident, his recovery from the cardiac and lung injuries would have been uneventful. The elucidation of the pathology of the brain lesion is difficult. The age of the patient and histological examination of the vascular system would rule out such causes as arteriosclerosis and syphilis. There was no evidence of infective endocarditis and a glioma could also be excluded. No intracerebral aneurysm was found to account for the lesion but it is possible that an aneurysmal sac, which would probably be very small in any case, could be lost in the hæmorrhage and so overlooked. The absence of defects in the walls of the cerebral vessels elsewhere, especially at their bifurcation, was to be noted. A case of intracere-

bral aneurysm in a child of 4½ years has been reported" (Herman and MacGregor, 1940). A comparison with this case shows that the site and extent of hæmorrhage in both were the same and, apart from the fact that in the case I am reporting the hæmorrhage ruptured externally and not into the ventricular system, we could say that the general picture was similar. A point of major importance however in the case here reported is the multiplicity and scattered nature of the hæmorrhage. The bleeding did not come from one single vessel but appeared to come from points scattered over a wide field as shown in the drawing. This with the absence of evidence of aneurysmal sac would suggest another cause for the hæmorrhage. In 1891 Bollinger reported five cases where intracerebral hæmorrhage had occurred at intervals varying from a few days to several weeks after a minor head injury and suggested that the sequence of events was that, at the time of injury, an area of softening developed in the brain substance and later hæmorrhage took place from a vessel wall thus weakened. At the time Bollinger recorded these cases the occurrence of intracerebral hæmorrhage was not recognized and so later writers have thrown some doubt on his conclusions but others have admitted that some such lesions as he described are possible. Symonds (1940) has reviewed the literature and reported on a case of delayed cerebral hæmorrhage which recovered and which was probably traumatic in origin. He agrees that there is such an entity as delayed traumatic apoplexy but points out that it must be extremely rare. We suggest that this case may be an example.

SUMMARY.

(1) A case is reported of a man aged 21 who had been subjected to trauma on two separate occasions at two days' interval. The only external injuries were a superficial cut on the forehead and a hæmatoma and cut over the occiput.

(2) Post-mortem examination revealed cardiac contusion, evidence of pulmonary concussion and a large intracerebral hæmorrhage.

(3) The possible ætiology of these lesions is discussed.

I wish to thank Colonel A. S. Heale, M.C., D.D.M.S. of the Command. for permission to publish this case and also Surgeon Commander A. Long, R.N., under whose care the case was admitted to hospital.

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NOTES ON CASES OF SMALLPOX TREATED WITH SULPHANILAMIDE.

BY LIEUTENANT-COLONEL J. D. COTTRELL,

New Zealand Medical Corps,

AND

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New Zealand Medical Corps.

INTRODUCTION.

DURING the autumn of 1942 a sharp civilian epidemic of smallpox occurred in an area in the Middle East Command. This reached its peak in November and, in the area in which the majority of the following cases occurred, 444 cases were reported during the months of October, November and December, a figure estimated to represent about one-third the total incidence. The estimated mortality was about 20 per cent.

During this period nine cases occurring amongst British troops were admitted to a New Zealand General Hospital. These, together with the case of one of the authors, commencing in September, and a Nursing Sister of the N.Z. Hospital (H. M.) make up the following series of eleven cases.

There were three deaths in the series.

The cases were classified as follows:—

Confluent: 4 cases, 3 deaths.

Severe: 3 cases, no deaths.

Mild: 4 cases, no deaths.

In all the cases except the three fatal ones the rash was that of smallpox "modified" by acquired immunity, the epidemic in general being one of severe Variola Major.

INCUBATION PERIOD AND SOURCE OF INFECTION.

Only in the cases of the Nursing Sister (H. M.) and one of the authors (J. D. C.) can the source of the infection be inferred. In the latter case exposure took place for about five minutes on one single occasion when visiting a local fever hospital in the very early days of the epidemic. Hence the incubation period can be worked out with considerable accuracy. The initial fever commenced on the afternoon of the ninth day and the rash first appeared in the early morning of the fourteenth day. In the other nine cases no source of infection could be traced though it is worthy of note that one soldier was stationed in the grounds of the local Quarantine Station then being used as an emergency smallpox hospital. Two other cases, who reported sick within two days of each other, slept in the same room and were presumably infected from a common source.

It may also be noted that another medical officer, who was present during the visit to the fever hospital in September, had a sharp five-day attack of fever commencing on the same date as did that of J. D. C. No rash developed but similar attacks have been noted in contacts in other epidemics and may represent abortive smallpox attacks.

VACCINAL HISTORY.

Whilst it is obviously impossible to draw any conclusions in such a small series yet certain facts may be stated here. In four of the cases no vaccination scars could be detected. Of these four, three died. The remaining case, aged 23, claimed to have been vaccinated in infancy and had a mild modified attack suggestive of considerable immunity.

All the other cases showed good "baby" scars. Of these seven cases four had had recent successful, though modified, "takes." These vaccinations were performed respectively twenty-nine months (severe case J. D. C.), twenty-two months (mild case H. M.), twenty-two months (mild case), and nine months (severe case) prior to the onset of the disease.

It is considered that the effect of a good "baby" vaccination is sufficiently long-lasting demonstrably to modify the effect of an attack of smallpox occurring twenty to thirty years later.

The nature of this modification will be discussed later in discussing the appearances of the true rash.

Three of the patients were re-vaccinated for the first time since infancy within the incubation period. In two of these cases the vaccination was probably too late to affect the course of the disease, being performed three and two days before the onset of smallpox and modification appeared to be due to "baby" vaccination. Their ages were 30 and 28 respectively. The third case was vaccinated six days before the onset and had a severe, though modified attack.

PRODROMAL RASHES.

Three cases only had prodromal rashes.

Both the usual types were seen, i.e. erythematous and petechial. One case was admitted as a case of measles; seen in an artificial light the diagnosis was "confirmed," even "Koplik's spots" being present. By the next morning a few vesicles were present on the face and the Koplik's spots had multiplied and were obviously the smallpox rash appearing in the mouth. This was a severe case.

Two cases of petechial rash were seen. In one the rash was more or less generalized on the trunk and limbs, intensified in the groins and axillæ. In the other it was practically confined to the axillæ and bathing drawers area. This case died. In addition to the petechial element bright pink macules and "flush" were observed in the area of the rash. All the cases with prodromal rashes subsequently had widespread rashes and fell into the severe or confluent group.

TRUE RASH.

The true rash as seen in this small series showed very clearly the classical differences induced by the presence or lack of a degree of acquired immunity in the patients. It is therefore proposed to describe separately the "modified" and "unmodified" rash as seen in these patients, together with a further "modification," due we believe to the exhibition of sulphanilamide.

It must be emphasized at once that the differences seen were essentially differences of *nature* rather than *extent*. Whilst in some well-vaccinated cases the rash merely consisted of a few countable papules and vesicles yet, in other successfully vaccinated cases, the extent of the rash was as great or greater than in the unvaccinated cases (*see* fig. 1).

In the unmodified cases the rash followed closely the typical textbook description with this significant exception that, even in the case which died on the fourteenth day, *no true pustules developed*. This is believed to be due to the exhibition of sulphanilamide. Apart from this modification the time taken in maturation and the appearances were quite typical and need no further description (*see* fig. 4).

In the cases whose rashes had been modified by previous successful vaccination certain characteristic changes were observed. The most striking of these was the speed of maturation of the rash. In the cases observed from the beginning, careful search would often reveal one or two vesicles at the time the rash was first noted. Thus, while in the fatal unmodified cases scabbing was by no means complete on the twelfth and fourteenth days, yet in even some of the moderately severe modified cases all the scabs had *separated* by the fourteenth day and scabbing was usually complete by the eighth to the tenth day at the latest.

In the modified cases the size of the individual pocks was much smaller though their actual numbers may have been greater. The case presenting with a morbilliform rash later had his face studded with hundreds of miliary vesicles, some a millimetre or less in diameter. Nevertheless in areas of pressure or local damage (i.e. garter area) these vesicles would be confluent. Classical confluence was also seen on the face (fig. 1).

In the modified cases the vesicles were much more superficial and tended to "fungate" outwards; this superficial character of the modified rash gave almost a false impression that these cases were more severely affected than the cases with the deeper unmodified rash.

Finally, in the protected cases, a proportion of the rash would "abort" at the papular or early vesicular stage, giving an appearance of false "cropping."

Nevertheless, despite these modifications, the fundamental characters of the smallpox rash remained. There was no true "cropping" and the sites affected were the classical smallpox sites.

Typical "melon-seed" bodies formed on the palms and soles and these small amber coloured discs could be slipped out of their "nests," when the thick overlying skin was incised, in the typical manner. Incidentally, it is

felt that these "melon-seed" bodies may be of considerable diagnostic significance in mild cases seen late in their course.

GENERAL CONDITION OF CASES.

The general condition of the patients on admission to hospital was much the same in all cases. Frontal headache, pains in the fascial planes and general weakness were constant findings while pain in the back, of a degree sufficient to warrant a spontaneous remark upon it by the patient himself, was present in only two of the series.

Dysphagia was present in five cases and commenced about the fifth or sixth day after the appearance of the rash.

Mental dullness progressed in four of the cases to a low muttering delirium and, in two of those with fatal outcome, two attempts to get out of bed and to active interference with nursing measures.

Vomiting was pronounced in four cases and, in the early stages, interfered with the fluid intake. Only in one of the severe and fatal cases did vomiting persist.

PROGNOSIS.

Few conclusions may be drawn on prognosis from such a small series but the following points emerge:—

(1) *Vaccinal State*.—It has been shown that of four cases presenting no vaccination scars three died.

A successful re-vaccination even nine months prior to contact with smallpox infection does not necessarily protect against an attack. The resulting illness will be modified.

(2) *Prodromal Rashes*.—Cases showing a petechial prodromal rash were severe and one died.

(3) *Severe Constitutional Symptoms*.—If these were present at onset, especially if accompanied by vomiting, they indicated a bad prognosis.

(4) *Extent of Rash*.—In vaccinated subjects the rash may be more extensive yet recovery will occur.

(5) *Failure of Primary Temperature to Resolve*.—This indicated an extremely grave prognosis.

(6) *Rising Pulse Rate*.—Cases which showed a rising tendency in the pulse rate at eighth to ninth day were attended with fatal outcome.

TREATMENT.

The treatment of the foregoing cases of smallpox can be discussed under the headings of:—

(a) *General and symptomatic*.

(b) *Chemotherapeutic*.

(a) *General and Symptomatic*.—While the usual recommended measures were adopted with regard to diet, sleep, the control of restlessness and delirium, constipation, cough, the toilet of eyes and mouth, collapse,

cyanosis, vomiting, etc., the treatment of the following may be worthy of note.

Care of Skin and Treatment of Rash.—In view of the absence of a purulent stage the usual and recommended treatments were modified by the application to the rash of a simple calamine lotion containing 1 per cent menthol and 1 per cent acid carbol. liq. as antipruritics. This we found to be greatly appreciated by the patients.

Dysphagia.—Next to the skin irritation, and combined with the dry non-productive cough, we found this to be the most distressing complication. In three cases it definitely cut down the fluid intake. Major Neil, Oto-Rhino-Laryngologist to the unit, recommended the official cocaine trochiscus but this not being on issue the dispenser improvised a lozenge as follows: Gelatine, 1 ounce; glycerine, 1 ounce; water to 4 ounces, all by weight.

To the above, cocaine hydrochloride was added in the proportion of one quarter of a grain of the cocaine salt per lozenge with enough for forty lozenges. This proved highly satisfactory, the patient demonstrating his gratitude for the relief obtained by increased fluid intake when a lozenge thus prepared was sucked before the taking of a drink.

(b) *Chemotherapeutic.*—The fortunately few opportunities which have presented themselves for studies upon the value of drugs of the sulphonamide series in smallpox account, presumably, for the paucity of the literature upon the subject.

In 1938 King and Rosario reported favourably upon the use of prontosil in one case, commenting upon the absence of the secondary rise of temperature usually associated with the pustular stage of the disease.

McCammon, in 1939, reported upon the use of sulphanilamide in four of a series of seven cases of smallpox observed by him. He commented upon the absence of a pustular stage in three of the cases so treated the remaining one merely showing three or four pustules.

Whereas in 1940 German literature indicated the sulphonamide series as the therapy of choice in smallpox and Manson-Bahr, Harries and Mitman in the 1940 editions of their books advocated it, Kolmer (1940), in a full review of the literature upon the therapeutic value of all the drugs of the sulphonamide series then in use, sums up the value of them in smallpox as "doubtful."

It was thought that the present series of cases, small as it is, might offer something in the way of evaluation of this form of therapy and, with this end in view, recourse was had to the pathological and histological findings in fatal cases by means of which we hoped to gain some idea of the response, if any, of the actual virus to the drug as well as any effect it might have upon the secondary invaders.

The drug employed was "sulphanilamide" (May and Baker).

An initial dose of two grams was given, followed by one gram four-

hourly, this dose being reduced to one gram three times a day when the condition of the patient was seen to be ameliorating.

Treatment was commenced as soon as the vesicular stage was reached and the average total dose was 22.5 grams given over six days.

Toxic Effects.—No serious toxic effects were seen. Five cases showed some cyanosis probably more referable to the pulmonary oedema and general toxæmia than to the sulphanilamide *per se*.

GENERAL PROGRESS OF CASES.

The main, if not sole, effect of the sulphanilamide appeared to be the reduction of complications due to pyogenic organisms; no effect was detected on the essential virus. There was definite mitigation of suppuration in the skin lesions, a lessening of ocular complications and a reduced incidence of pulmonary complications.

Instead of a true pustular stage there was a vesicular stage in which the vesicular fluid was slightly milky and not yellow even in those cases with a fatal outcome. The process was later one of desiccation and desquamation rather than of the classical pustulation and scabbing.

No more different a picture could be imagined than that observed by one of us (H. T. K.) in Central African natives during smallpox epidemics. Here the rash ran its textbook course, each vesicle becoming a yellow pustule which, in the confluent cases, brought away the superficial epidermis as abscess roofs.

It is not believed that the reduction of complications due to pyogenic invaders is the result solely of improved skin and ocular hygiene.

The case of a mission hospital trained native midwife's child is something in the nature of a control (H. T. K.). In this case, despite all which could be done apart from chemotherapy in the care of eyes and skin, a profuse purulent conjunctivitis developed. There was pustulation resulting in slight "pocking" but otherwise complete recovery in every respect. In addition it is reported that, in a recent epidemic in a military hospital in Iraq, cases not given sulphanilamide have developed typical creamy pustular rashes. (Personal communication.)

With regard to the ophthalmic complications, which are too often the sequel to an attack of smallpox among uncivilized and unhygienic races where purulent conjunctivitis may develop into panophthalmitis with complete destruction of the globe, in this series five of the cases had a serious ocular discharge, one being frankly purulent. These lesions underwent complete recovery, there being no ulceration visible even in cases coming to autopsy.

We confirmed the observations of McCammon, King and Rosario upon the effects of chemotherapy as registered upon the temperature chart. There was no textbook secondary rise of temperature about the ninth or tenth days. The residual cutaneous lesions of the recovered cases were merely slowly fading macular erythemata with extremely minute "pock-



FIG. 1.—Case P.



FIG. 2.—Case P.

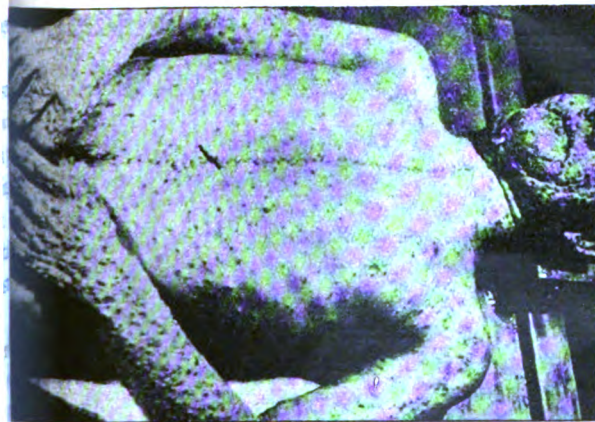


FIG. 3.—Case J.

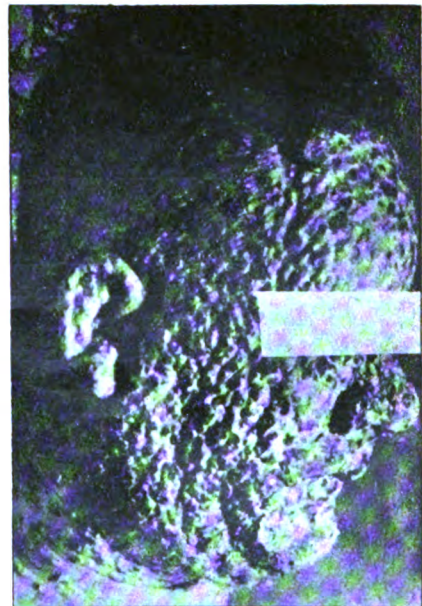


FIG. 4.—Case J.

FIG. 1.—Case P., 10th day. Aged 30. Vaccinated in infancy. *Good* scar. This picture shows the outward "fungation" of the epithelium of the face with confluence of rash.

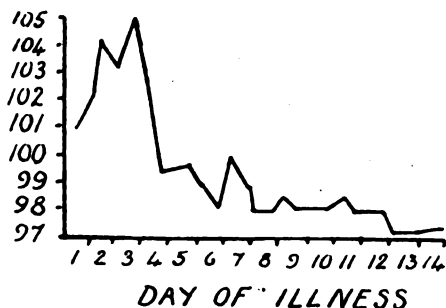
FIG. 2.—Case P., 16th day. By reason of lighting difficulties this picture does not do justice to the completeness of recovery, pitting being almost absent. The mottled areas showing were only faintly macular.

FIG. 3.—Case J. Death 12th day. Aged 22. History of vaccination in infancy. Photographs at autopsy. *No* scar. This demonstrates the classical centrifugal distribution of a smallpox rash sparing the flexures.

FIG. 4.—Case J. Showing the marked oedema of the cutaneous and subcutaneous tissues.

ing" but it must be admitted that the recovered cases were "modified" cases.

In conclusion it is believed that the suppurative stage can be greatly reduced and, in many cases, abolished and, in addition, the incidence of other complications due to sulphonamide sensitive organisms, e.g. bronchopneumonia and conjunctivitis, considerably lessened. It is only fair to assume that lessened suppuration will lead to reduction in subsequent scarring. Lest it be contended that the absence of secondary fever and extensive scarring are solely due to the fact that these are modified cases, the temperature chart and photographs of a case of confluent "modified" smallpox are included.



Temperature Chart. Case P. shows the absence of secondary fever.

PATHOLOGY.

A complete post-mortem examination, with the exception of the cranial cavity, was done on each of the three fatal cases.

The findings were those of a generalized toxæmia especially affecting the adrenals in which, in two of the cases, there were macroscopic and, in the remaining one, microscopic hæmorrhages.

All cases showed the pocks extending from the oral cavity into the larynx. In one case the pocks extended as far as the bifurcation of the trachea and in the others pocks were showing in the smallest dissectable bronchioles.

In all cases the lungs showed marked œdema but in one case only was there microscopic evidence of an early bronchopneumonia.

Microscopical section through the skin pocks showed a heaping up of the normal squamous epithelium about the pocks and a heavy infiltration by acute inflammatory cells. Considerable necrosis extended into the subcutaneous tissue. At the time of the cutting of the sections remnants of the trabeculæ could be made out but the majority had broken down and become disintegrated.

SUMMARY.

Eleven cases of variola of varying severity occurring in Middle East Forces have been followed. The effects upon them of sulphanilamide have been studied. Attention is drawn to the following points:—

(1) The prophylactic value of a good "baby" vaccination in modifying the mortality from the disease.

(2) The modification of the rash due to the exhibition of sulphanilamide, i.e. no true pustular stage developed.

(3) The modification of the "classical" variola temperature chart by the exhibition of sulphanilamide, etc., abolition of secondary fever.

(4) The lessening of the pyogenic coccal complications in eyes and lungs by sulphanilamide.

(5) The extent to which the pocks invade the bronchial tree.

(6) The apparent lack of any effect of sulphanilamide upon the actual virus of smallpox.

ACKNOWLEDGMENTS.

Our thanks are due to Brigadier Russell, D.M.S., — Army, at whose instigation, and to D.M.S., 2 N.Z.E.F., and Colonel G. W. Gower, Officer Commanding Hospital, by whose permission, this paper was published.

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A SURVEY OF METHODS OF TREATMENT OF TROPICAL ULCERS.¹

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INTRODUCTION.

THE purpose of this paper is to record observations on the treatment of 156 cases of tropical ulcer occurring in West African native soldiers stationed in Sierra Leone. The time lost from duty by troops suffering from tropical ulcer is such that it is necessary to find the quickest method to return these men to full service. Various lines of treatment have been tried and are here compared.

INCIDENCE.

Military records of the number of hospital admissions for tropical ulcer from May 1, 1938, to December 1, 1941, are shown in the following table:—

TABLE I.

Year	Hospital Admissions African	No. Cases Tropical Ulcer	Per cent.	Days per case
1938	215	34	15.81	6
1939	550	28	5.09	13.5
1940	1155	80	6.92	16.8
1941	4541	204	4.33	29.3

Admissions prior to 1941 were to a C.R.S. from which patients were discharged to units for final treatment. All cases treated in 1941 were completely cured on discharge. During the period January 1, 1941, to December 1, 1941, there were 2,834 admissions of European soldiers and officers to the hospital, none of whom suffered from tropical ulcer.

TABLE II.

DURATION PRIOR TO ADMISSION TO HOSPITAL OF 97 CASES.

Time in weeks	Number of Cases	Percentage
0—4	71	73%
4—12	17	18%
Over 12	9	9%

97 cases averaged 5.51 weeks per case prior to admission.

CLASSIFICATION OF TROPICAL ULCER.

Tropical ulcers fall into three groups, depending on the origin and duration.

(a) Recent ulcers with a history of trauma, or the formation of a non-traumatic vesicle.

(b) Recent ulcers of the above type but becoming phagedænic in character.

(c) Chronic or recurrent ulcers originating from (a) or (b).

¹ Forwarded by permission of Colonel L. A. Harwood, T.D.

ÆTIOLOGY.

A history of definite trauma was obtained from 91 out of 156 cases or 58·3 per cent. The injuries take the form of cuts by barbed wire, machette or glass, abrasions on stone or in bush or scratches at the site of scabietic infections. The remaining cases could not give a definite cause for the start of the ulcer. The troops wear boots or puttees only when marching in the bush; puttees only on parades and fatigues. The result is seen in the fact that, in 156 cases having 175 ulcers, 78 per cent of the ulcers were situated on the feet and ankles (as shown by the following table).

TABLE III.
SITE OF ULCERS (175).

Site	Right	Left
1. Leg anterior	11	13
2. Leg posterior	5	10
3. Dorsum foot	17	22
4. External malleolar region	10	11
5. Internal malleolar region	7	20
6. Great toe and 2nd toe	13	12
7. Other toes	5	4
8. Heel and plantar aspect of foot ...	8	7

DIET.

(a) Scale of rations for African Rank and File and authorized followers R.W.A.F.F. as from December, 1941, are:—

Item	Quantity	Notes
(a) Daily Issues.		
(i) Meat fresh (beef or goat flesh)	6 oz.	
or		
Meat preserved	4 oz.	
or		
Fish fresh	8 oz.	
or		
Fish preserved	4 oz.	
(ii) Maize Flour	8 oz.	Will be issued three times weekly to natives of Nigeria, Sierra Leone and Gambia and twice weekly to natives of the Gold Coast.
or		
Rice and	4 oz.	Will be issued three times weekly to natives of Nigeria, Sierra Leone and Gambia and four times weekly to natives of the Gold Coast.
Palm oil	2 oz.	
or		
Bread and	6 oz.	Will not normally be issued.
Maize or rice	4 oz.	
or		
Bread and	6 oz.	Will not normally be issued.
Palm oil	2 oz.	
or		
Biscuit	8 oz.	Will be issued once weekly to all troops.
(iii) Salt	$\frac{1}{2}$ oz.	
(iv) Peppers, country condiments, Dawa-Dawa Egusi, etc....	$\frac{1}{2}$ oz.	
(v) Rice	20 oz.	Will be issued once weekly to natives of Nigeria, twice weekly to natives of Gold Coast and five times weekly to natives of Sierra Leone and Gambia.
or		

Guinea cornflour	...	20 oz.	Will be issued three times weekly to natives of Northern Nigeria and once weekly to natives of Southern Nigeria.
or			
Maize flour	...	1 lb.	Will be issued twice weekly to natives of Southern Nigeria, Sierra Leone and Gambia and once weekly to natives of the Gold Coast.
or			
Yams (or potatoes)	...	3 lb.	Will be issued twice weekly to natives of Northern Nigeria, three times weekly to natives of Southern Nigeria and four times weekly to natives of the Gold Coast.
or			
Millet (gero flour)	...	1½ lb.	Will be issued once weekly to natives of Northern Nigeria.
(vi) Palm oil	...	2 oz.	
(vii) Native vegetable	...	*8 oz.	
(viii) Fruit	...	4 oz.	
(ix) Native beans, lentils, split			
peas or ground nut	...	2 oz.	
(x) Sugar	...	1 oz.	
(xi) Cocoa (or local coffee)	...	¼ oz.	
(b) Weekly Issues.			
(i) Cigarettes native	...	10	
or			
Tobacco	...	2 oz.	
(ii) Soap	...	4 oz.	
(iii) Kola nuts	...	2 oz.	

Note : *When procurable.

Meals—African Troops.

- | | | |
|----|------------|-------------------|
| 1. | 6.30 a.m. | Bread and coffee. |
| 2. | 11.30 a.m. | Full rice chop. |
| 3. | 5.00 p.m. | Full rice chop. |

This is in contrast to the civilian population who have one main meal a day—at midday.

(b) Tropical ulcers in African troops in Sierra Leone are more common in recruits with less than nine months' service than in old soldiers.

Ulcers found in Nigerian troops tend to be larger and more heavily infected than in Sierra Leone troops, this being due in part to the difficulty in obtaining proper Nigerian food (maize, etc.) which differs from the diet of the local troops.

While the diet of the African troops is better than the average civilian diet it is, nevertheless, a low protein diet¹ which tends to ulcer formation (James [1]).

During the first part of the wet season fresh fruit is difficult to obtain, a factor in the general dietetic deficiency of vitamins and calcium (Brown [2]).

For full discussions on diet and tropical ulcer the reader should refer to the excellent papers of Corkill [6] and James.

INFECTION AND ASSOCIATED DISEASES.

As 58.3 per cent of cases were due to trauma and, as cases of trauma treated by the writer, whilst acting as a R.M.O., with iodine and strapping

¹ Even after full allowance has been made for wastage in preparation and cooking of the ration, the protein content must still be well above the 70 grams considered adequate for an adult male.—EDITOR.

immediately after injury never developed ulcers, it would seem that untreated wounds with secondary infection tend to develop into ulcers.

All the troops affected were subject to chronic malaria, exhibited chiefly when exposed to severe weather or fatigues. Most soldiers had old ulcer scars on the legs and feet. No cases suffered from leprosy.

PATHOLOGY.

Pathological investigations were carried out on a series of patients with the following results:—

(1) Dark ground illumination		45 cases
(a) Spirochaetes	present	9 cases
	absent	27 cases
(b) Motile bacillus	present	6 cases
(c) <i>a</i> and <i>b</i> combined	present	3 cases
(2) Culture from ulcerated surface		28 cases
(a) <i>Staphylococcus aureus</i>		7
(b) <i>Staphylococcus albus</i>		4
(c) <i>Bacillus proteus</i>		5
(d) <i>Staphylococcus aureus</i> and <i>albus</i>		7
(e) <i>Bacillus proteus</i> and <i>Staphylococcus aureus</i>		2
(f) No organism grown		3
(3) Kahn reaction		56 cases
Positive	32	57.1 per cent.
Negative	24	42.9 per cent.
(4) Blood examination		28 cases
(a) Average R.B.C.		4,321,000
(b) Average Hb.		83.9 per cent.
(c) Average C.I.		0.87 per cent.

TREATMENT.

(1) *Preventive Measures.*

(a) Iodine and strapping should be immediately applied to all wounds.

(b) Boots and puttees should be worn on all parades, fatigues and marches.

(c) Malaria should be energetically treated by quinine, plasmoquine, etc. Camps should be in malaria free areas.

(d) Protein content of the diet should be raised and adequate vitamins ensured by administration of marmite and ascorbic acid. In the wet season when fresh fruit is scarce the incidence of ulcers increases.

(2) *General Treatment.*

(a) *Diet.*—In view of the findings of Connell and Buchanan [3] (1933), Clements [4] (1934), Loewenthal [5] (1932), all quoted by Corkill [6] (1939), and James [1] (1938), and, as many of the patients exhibited clinical evidence of avitaminosis, i.e., blueness of gums, buccal frieze and glossal lividity, ulcer cases were placed on the standard diet for African troops supplemented by:—

(1) *Ascorbic Acid Tablets* (0.025 gm.) in the following dosage:—

1st day — 15 tablets.

2nd day — 15 tablets.

3rd day — 10 tablets.

Thereafter 4 tablets daily during treatment.

(2) *Marmite*.

One tablespoon daily (as a hot drink).

(3) *Oleum Morrhuae*.

One drachm t.d.s.

(4) *Calcium Lactate*.

Grains xv t.d.s.

Twenty-five consecutive cases were given the supplemental diet. The average stay in hospital was thirty-one days per case. These cases were on different types of local treatment, however, and we are therefore unable to comment on the conclusions of the investigators quoted above.

(b) *Associated Diseases*.—Only those cases developing malaria in the wards were treated with quinine and plasmoquine. Facilities were not available for routine stool examinations hence investigation and treatment of the helminthic factor could not be undertaken except in cases exhibiting acute clinical symptoms of helminthic infestation. Cases having a positive Kahn were divided into two groups:

(i) Ulcers clinically typical of syphilitic infection. These cases were treated by a routine arsenical course until the ulcer healed and they were then sent back to units for completion of antisyphilitic treatment.

(ii) Ulcers clinically non-syphilitic. These received: (a) Acetylsarsine 3.0 c.c. every other day for 7 injections, or (b) Sulphostab 0.45 gram every fifth day for 5 injections.

A number of cases exhibiting a negative Kahn also received the arsenical treatment detailed above.

In both the groups so treated the healing rate was not different from the healing rate of cases not receiving arsenical treatment.

(3) *Local Treatment*.

Most forms of treatment are divided into two stages: (1) stage of cleaning the ulcer; (2) stage of healing or epithelialization. Various methods have been tried:—

(1) *For cleansing purposes*.—Excision, cauterization, or the application of zipp, copper sulphate, ox-bile, sulphanilamide or M & B "693."

(2) *To stimulate epithelialization*.—Application of cod-liver oil, various dyes and elastoplast.

Corkhill [6] advised cod-liver oil dressings; James [1] copper sulphate and elastoplast for small ulcers—excision and skin graft for large ulcers; Earle [7] found oral administration, or local use with elastoplast, of sulphanilamide and M & B "693" to have no effect on chronic ulcers but to

be of some use in recent ulcers; Brennan [8]¹ in East Africa found an ointment of cod-liver oil, eusol, vaseline and ung. zinci useful for cleaning up ulcers; McGuire [9] used copper sulphate daily for cleaning; Duran [10] advised zinc oxide-ichthyol ointment to clean, then 1 per cent picric acid daily, followed by zinc paste and elastoplast; Bell [11] suggests potassium permanganate powder, eusol and, when clean, adhesive plaster; Fusco and Chionetti [12] used daily ox-bile dressings; Dale [13] and Buchanan and Sanderson [14] advise zipp and plaster of Paris bandage.

A.—*Treatment of Ulcers other than those involving Toenails.*

A comparison of results in 87 cases treated by various methods is tabulated below. All cases were kept in bed until reasonably clean; once clean they were treated as up-patients but not employed on fatigues until a few days before discharge. Cases undergoing pathological investigations were treated with saline dressings until the laboratory work was done, usually for forty-eight hours; they then commenced the type of treatment decided on.

TABLE IV.

Type of Treatment	Number of cases	Hospital days per case
Elastoplast changed every 7 days	24	32.6
M & B "693" powder and elastoplast changed every 5 days	4	33.6
Sulphanilamide powder and elastoplast changed every 5 days	5	56.2
Saline dressings twice daily	6	28.6
Saline soaks and sulphanilamide compresses daily	10	28.4
Zipp and elastoplast	10	19.8
AgNO ₃ 5 per cent. and zipp and elastoplast	8	19.8
Zipp and elastoplast and cod-liver oil dressings daily when clean	10	26.6
Cod-liver oil dressing daily	6	26.5
Triple dye and cod-liver oil dressings daily	4	28.00

Of the remaining 40 cases (not including 28 cases of ulcers involving the toenail) which were treated by various combinations of the above methods, 11 cases made no real improvement until finally placed on zipp and elastoplast dressings. Cases treated by scraping the ulcer, cauterizing the ulcer with 10 per cent AgNO₃ and then applying zipp and elastoplast did not heal quicker—due probably to the necessity of replacing some of the granulations removed.

From the experience gained in treating the above 127 cases a routine local treatment was decided on.

(1) Small ulcers under 2.0 cm. diameter were treated by zipp and elastoplast changed every seven days until healed.

(2) Medium ulcers of approximately 2.0 cm. to 4.0 cm. diameter were cauterized with 5 per cent AgNO₃ for three minutes; this was washed off with saline; then zipp and elastoplast employed until clean; finally either daily or every other day dressing with cod-liver oil or daily application of triple dye solution was done.

(3) Large ulcers over 4.0 cm. diameter were treated with zipp and elastoplast until clean (seven to ten days) and then by Thiersch graft or by immediate excision of ulcer and scar tissue (best for chronic ulcers) followed by immediate Thiersch graft.

Note.—(a) Zipp—Zinc oxide and iodoform	...	1 part each
Soft yellow paraffin	...	2 parts
(b) Triple dye—Crystal violet	...	0.2 per cent
Acridine	...	0.2 per cent
Brilliant green	...	2.0 per cent
Aqueous solution.		

B.—Treatment of Ulcers Involving Toenails.

Tropical ulcers involving the nail beds of the toes present a somewhat different picture from the standpoint of treatment. Twenty-eight cases are here reported. These cases occur from stubbing the toes, injury by rifles, etc. The picture is that of a typical tropical ulcer plus a deep-seated fungoid infection under the nail and skin which is very slow to heal by ordinary methods of treatment.

Various types of treatment were tried, i.e. saline dressings, M & B "693" powder and elastoplast; elastoplast only; foment and sodium sulphate; 12½ per cent flavine emulsion. Finally a combined operative and cauterizing treatment was devised.

		TABLE V.	Hospital days per case
No. of cases	Treatment		
20	Various treatments		47.9
8	Removal of nail, curettage of nail bed and cauterize by AgNO ₃ , 10 per cent. for 3 minutes followed by saline. zipp dressings daily until clean; then either triple dye daily or C.L.O. every second day until healed		23.0
The above treatment plus the supplemented diet is the routine treatment used here for all tropical ulcers involving a toenail.			

SUMMARY.

- (1) 156 cases of tropical ulcer in African troops have been reviewed.
- (2) The ætiology has been noted.
- (3) The preventive measures, general and local treatment of tropical ulcers have been discussed.
- (4) A plan of treatment for ulcers other than those involving toenails has been described.
- (5) A method of treatment for ulcers involving the toenail is detailed.

The writer wishes to thank Lieutenant-Colonel F. A. R. Stammers, R.A.M.C., and Lieutenant-Colonel John Bruce, R.A.M.C., for their kindness and help in the preparation of this paper.

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2, 8, 10, 11, 12 quoted from *Trop. Dis. Bulletins*.
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OCCUPATIONAL THERAPY FOR PSYCHONEUROTICS IN HOSPITAL.

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AND

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In the early days of this War there were few special hospitals set apart for the treatment of War Neuroses. Such cases as arose were for the most part dealt with as out-patients in General Hospitals. As the Army grew in numbers and neuroses from Norway and France arrived in this country the need for special hospital facilities became greater.

REASONS FOR ADMISSION TO HOSPITAL.

Psychiatrists in the Army are of necessity limited in number. They are posted to certain military centres and each deals with all the military psychological casualties that arise in the surrounding area, often covering many square miles. It is frequently necessary to recommend repeated psychiatric interviews for cases of severe neurosis. If these cases are widely dispersed in the area it is impossible to have them attending as out-patients for several reasons; so much time is wasted on journeys, the soldier has to be excused all sorts of duties and discipline becomes slack and he may be a source of psychological infection in the unit. Thus it comes about that neurotics requiring more than a few psychiatric interviews are admitted into special hospitals for observation, investigation and treatment. It is on observations made in one such hospital that the following notes are based.

PROBLEMS OF HOSPITAL MANAGEMENT.

As most psychoneurotics have no physical illness these hospitals are faced with the novel situation of having their beds filled with patients who do not need to be in bed at all by day. These men are inspected each morning by the Medical Officer on his daily ward round but treatment is carried on for the most part in personal interviews. About thirty cases are allotted to each Psychotherapist and if he can interview each case on alternate days for half an hour in addition to his other hospital routine duties he is not letting the grass grow under his feet. It follows that the patients have a good deal of spare time on their hands and it has been found that if the daily routine is not properly organized such military morale as these patients have possessed is rapidly lost.

TYPE OF PATIENTS.

The patients dealt with include hysterics, anxiety neurotics, obsessionals, borderline oligophrenics, psychopathic personalities and psychotics. 50 per cent of our hospital beds are allotted to neurotics, 25 per cent to psychotics and 25 per cent to the borderline cases, psychopaths, delinquents, etc.

The neurotic cases may be divided into two rough groups: (a) Acute war neuroses in which the condition has been precipitated by war trauma; (b) subacute and chronic cases not precipitated by war trauma but brought about in predisposed persons by lack of adaptation to the community life of the Services.

With us the second group predominates and a great part of our work consists in dealing with this maladaptation.

Most of these neurotic cases are self-centred, individualistic and poor mixers. Left to themselves they become very readily "browned off." They bore each other with the recital of their complaints. They become discontented, depressed and often truculent and very quickly an atmosphere can spread through the hospital which is anything but conducive to cure. As a great number of our neurotics are extremely suggestible one disadvantage of having numbers segregated in a special hospital is that cases of cross-infection may occur. In civil nursing homes for neuroses the patients, in their own interests, are strenuously exhorted to refrain from mentioning to their fellow sufferers anything about their symptoms or treatment. Obviously such exhortation cannot be so effective in the Services.

OCCUPATIONAL THERAPY.

The importance of Occupational Therapy for Psychotic and Orthopædic cases has long been recognized and therapists to-day are specially trained—and well organized. The need for this therapy for neurotics is, however, not sufficiently appreciated. Of course, during the Great War, "shell shock" hospitals had their handicraft centres but, to-day, it is necessary to get beyond the "arty crafty" stage of occupational therapy, merely as a pastime for bored individuals, to the conception of the use of specially selected graduated occupations as a positive help in the cure of the neuroses. Perhaps this neglect of occupational therapy and its use in the treatment of the neurotic is due to the fact that in civil life neurotics are for the most part treated as out-patients who carry on with their normal work and live in their usual environment in the intervals between psychotherapeutic interviews.

Thus it happened that no provision was made in Military Hospitals for the employment of specially trained occupation therapists nor were there any funds available for the purchase of raw materials or tools for handicrafts. The organization of an adequate occupational therapy department was accordingly left to the importunity of the medical officers and the

generosity of such local inhabitants as could be sufficiently interested in the project.

SUPPLY OF RAW MATERIALS AND TOOLS.

An account of the measure of our success in establishing a satisfactory occupational therapy department may be helpful to medical officers elsewhere. When we first started this department here we were fortunate in obtaining the voluntary services of a trained Occupational Therapist, the wife of an officer in the Garrison, who gave a series of lectures and demonstrations to the nursing and medical staffs and set us off on the right lines.

We have also been fortunate in being well-served by generous local inhabitants. We happen to be within five miles of a city with a first-class Technical School. The authorities there allow us to send, gratis, a party of thirty men for a two-hour session on two afternoons a week. There our patients receive instruction in woodwork, weaving, clay modelling, metal work, drawing, lino-cutting and sign writing. More important than this, certain of the Technical Staff, notably the Woodwork and Drawing Instructors, visit the hospital regularly and conduct classes in the day rooms. The practical work thus begun is continued in sessions supervised by our N.C.O.s in the intervals between visits from the Instructors.

The problem of funds for raw materials and for Technical Instructors has been overcome by various methods. A special Occupation Therapy Account was formed into which patients paid cost price for any material used in constructing articles for their own use. Any orders executed for benevolent patrons outside the hospital were sold to them at market price. The sale of our Christmas Cards made on the premises to the hospital staff and patients brought in a substantial profit.

We have been enabled to carry on woodwork classes in the hospital daily by a loan of carpenters' benches and tools from the local civil Education Authorities whose Training School premises for primary teachers was commandeered for other purposes. Carpenters' tools can now be obtained for this purpose from Ordnance and taken on hospital charge.

Basketwork, rug making, needlework (sock darning) and weaving on small handlooms made in our own woodwork classes have been conducted in the hospital by ladies from the local Blind Welfare Association who have given their services voluntarily.

A large amount of furniture damaged in air raids was obtained through the good offices of a local officer patient. This was invaluable material for our woodwork class.

Much has been begged, borrowed or acquired. In fact there is no wile or nuance of mendacity or mendicancy to which we have not descended to secure the materials essential for the maintenance of this department.

ARMY EDUCATIONAL CORPS.

The A.E.C. is responsible for arranging activities which may be classed as diversional occupation and the local Area Army Education Officer has

been one of our most invaluable collaborators. Certain materials such as drawing paper, pencils and paints and a limited amount of timber were indented for through his department. The Army Education Officer has been able to secure for our visiting Technical Instructors some financial return for the time spent in this hospital. In addition he has arranged during the Winter Sessions for two evening lectures per week, often illustrated by lantern slides, on a variety of subjects. This is just part of the general Army Education Scheme and for this purpose our patients are looked upon as forming a self-contained unit. He has also been most helpful in the matter of transport for these varied activities.

A Serjeant of the A.E.C. has been allotted to us temporarily and in his hands is now the charge of all tools and materials and the supervision of all classes. He also controls the hospital library and debates and discussions on current affairs and teaches map reading and other military subjects. Under him we have two R.A.M.C. Lance-Corporals. One with special experience of handicraft in civil life is in charge of indoor occupation, the other, who is a professional gardener, is in charge of all outdoor occupation.

As for the various occupations some are certainly more popular than others. Woodwork and metal work take first place. The number of small articles such as cigarette boxes or regimental badges soldered into ash trays that can be sent home to wife or sweetheart is very great. Wooden toys for the children at Christmas were much appreciated.

Drawing on the whole is unpopular. In restoring confidence to patients it is essential that they should be able to produce quickly something which can stand comparison with the finished product of an expert. It is much easier for the novice to achieve this end in woodwork or metal work than in drawing. Even sign-writing is more popular than drawing and as a result of this work all our hospital rooms are properly labelled. The letters are made to exact measurement with set square and ruler in an elementary class and the results appear to be anything but the work of novices. The Technical Instructors speak highly of the intelligence of our neurotic patients and find them on the whole more interesting and progressive pupils than their civilian adolescents. They all agree that whatever their artistic sense they learn the technique of a craft at an astonishing rate.

The discovery of unsuspected ability in metal work and woodwork classes has been of great service in subsequent disposal of cases, e.g. an aircraftsman, a milkman in civil life, suffering from an hysterical aphonia, expressed great unhappiness at being in a Balloon Barrage unit. He showed extraordinary ability, which he had not suspected he had, with his hands at metal work and on the strength of this he was recommended for training in a skilled trade and made a successful readjustment.

Physical training, gardening, ground maintenance and the heavy work involved in digging and draining slit trenches is not generally popular but

each man has to take his part and sinks his personality in the common welfare of the hospital as a whole.

Football and baseball and cricket have their skilled exponents and supporters and, for those who cannot get interested in team games, there are para-military exercises such as cordon breaking and the rounding up of paratroops, etc., in which Officer and N.C.O. patients can play their proper role, teaching the men field craft and giving opportunity for display of initiative and ingenuity. These exercises are very popular and inculcate military morale without the tedium of barrack square drill.

DAILY ROUTINE.

Our aim is to have each patient as fully occupied from the time he gets up until after tea as he would be if on full duty with his unit.

Our time table is roughly as follows:—

6.30 a.m.	Reveille; wash and shave and clean wards.
7.30 „	Breakfast.
8.30 „	M.O.'s round.
9.00 „	P.T. class.
9.30 „	Break for light refreshments.
10.00—12.00	Occupation in day rooms, woodwork, rug making, etc., or, alternatively, out of doors, gardening, ground maintenance, trenching, etc. On Monday and Thursday woodwork instructor attends; on Saturday the drawing master. On Tuesday, Wednesday and Friday the patients carry on under the N.C.O.s i/c indoor and outdoor activities.
12.00—12.30	Dinner.
2.00—4.0 p.m.	On Mondays and Wednesdays: technical school. On Tuesdays and Thursdays: organized games or para-military exercises. On Fridays: pay parade. On Saturdays: Army Kinema Service presents a film.
4.00	Tea.
5.30— 7.00	Monday: Visit by ladies of Blind Welfare Association to instruct in basket making, rug making and needlework, etc. Tuesday and Thursday: Army lecture.

So that all patients can be occupied at the same time between 10.00—12.00 and 2.00—4.00 daily, wards alternate between outdoor and indoor occupations.

After tea those who have done their full day's work are free for recreation and can enjoy such privileges as they have earned.

We have been also very much indebted to the ladies of the local Overseas League who have organized innumerable parties, whist drives, dances and theatrical performances in which the patients have displayed histrionic skill. Our patients are excellent actors. Although this does not exactly

come under the heading of Occupation Therapy yet it has assisted materially in keeping up the "morale" of our patients.

It will be seen that there is now a great variety in choice of occupation. The choice, however, is not left to the patient but prescribed by the doctors and this very often results in a patient being given a task at which he has no skill in preference to one in which he is good with the express purpose of bringing out in him some new quality and fresh interest.

AN ILLUSTRATIVE CASE.

A fairly typical case in point is that of a W.O.II, aged 44, with twenty years' regular service to his credit who held a responsible clerical post and had been court-martialled and severely reprimanded for "sitting" on official correspondence. On returning to work it was not long before he repeated the same offence. His Commanding Officer sent him to see the area psychiatrist and he was admitted to hospital in a state of agitated depression. He could not concentrate on anything and had severe insomnia. He was not very easy to help with psychotherapy. He had read a good deal about psychoanalysis and did not hold with it.

He was introduced to woodwork, a handicraft at which he was extraordinarily bad because all his life had been devoted to intellectual and devotional pursuits. However this occupation which was so strange to him absorbed his whole interest. He found himself in healthy competition with young soldiers and gradually a whole new field of activity was opened up to him.

He became much more friendly and co-operative. A claustrophobic symptom was revealed and this had first come on when he was listening to a sermon in church and was associated with a moral lapse about which there was exaggerated guilt feeling. He had over-compensated for this by setting himself impossible standards of efficiency. He was now able to accept a good deal of psychotherapeutic help and his treatment was completed by a short course in modern office methods in the local technical school.

Follow-up of his case six months after return to duty says: "He has done excellent work, has not ailed a single day and describes himself as 'completely cured'." He has been promoted to W.O.I.

It is sometimes thought by the lay mind that medical psychologists exist for the sole purpose of making excuses for the delinquencies of neurotic patients and that they insist on them being given a free hand in the expression of their perverse personalities.

That is not our conception of the role of the psychotherapist. In civil practice the oddity, as a result of psychotherapy, becomes less odd and conforms more to his surroundings. In the Army, if our neurotic patients are to be returned to their units for further useful service, we must evoke, preserve and enhance their military morale.

We found that in the early phases of this scheme when we allowed our patients more or less to please themselves as to which classes they would attend the scheme was not a success. They encouraged each other in lack of co-operation and developed a community atmosphere of Negativism.

We appreciated that the germ of community life had been sown and developed it in a favourable direction by the compulsory system whereby occupations were prescribed just like medicines and had to be taken at precise times.

While every effort is made to induce patients to display their idiosyncrasies, to abreact or air all their personal grievances about the Services in the seclusion of the M.O.'s Office during psychological interviews, any public exhibition of unrestrained emotion, discontent or insubordination in the wards is immediately checked. For example one afternoon at tea time the names of those detailed to attend an Army lecture in the evening were announced. One patient, instead of merely replying to his name when called said, "I blank, blank, am not going to attend any blank, blank, lecture." He was immediately placed on a charge and brought before the Commanding Officer next day. His excuse was that he was suffering from "nerves" and could not help himself. This was not accepted as adequate and he was awarded fourteen days C.B.

Another patient suffering from hysterical contracture of the left hand had been granted compassionate leave. He had wired asking for an extension but this could not be granted. However he took the law into his own hands and returned in his own time. He was dealt with summarily and awarded seven days' detention which he served in spite of his disability. Both these were regular soldiers who had been wounded in France. Both were exhibiting hysterically exaggerated symptoms. Apart from temporary resentment these punishments had a salutary effect not only on them but on all the patients in their wards. They both recovered and returned to duty.

Of course, any patient who cannot really be held responsible for undisciplined behaviour we transfer to the delinquent or psychotic sections.

Neurotics are not pampered in hospital. On the contrary, by a blending of therapy and discipline we endeavour to transform their self-pity into self-respect.

We make it clear to our psychoneurotics that they are in much the same position as they would be if undergoing psychotherapy in civil life. The civilian attending a psychotherapist is induced to abreact during each interview with the physician but in the intervals he has to conform to social conventions.

We like to avoid punishments in dealing with neurotics in hospital but do not hesitate to award them when faced with gross breaches of military discipline even if it means that an individual has to suffer for the sake of the hospital atmosphere as a whole.

Our main aim, however, is by judicious use of a graduated scale of privileges, by group occupational therapy and individual psychotherapy, to encourage patients through the various phases of readjustment until they have reached the stage where they are fit for duty again both mentally and physically.

SUMMARY.

(1) It is pointed out that there was no special provision made for the supply of Occupational Therapy materials or for the employment of a trained Occupational Therapist in Military Hospitals.

(2) The various expedients adopted in establishing an Occupational Therapy department are described.

(3) The importance of compulsion is stressed.

(4) Hospitalization must not be an escape from military routine. Military discipline and morale can be maintained best in a hospital of this type by a system of rewards and privileges for good behaviour and freedom from neurotic symptoms.

(5) In special hospitals where neurotics are segregated it is essential to have properly organized Occupational Therapy in addition to individual psychotherapy if rehabilitation to the community life of the Services is to be achieved quickly.

THE "PHENOL AND CAMPHOR" TREATMENT OF RINGWORM OF THE GLABROUS SKIN. AN INTERIM REPORT.

BY CAPTAIN G. GWYNNE WALDIN,
Royal Army Medical Corps.

BEING an Army Medical Officer, and being impressed by the numerous cases of ringworm of the glabrous skin seen on sick parades, I resolved to test the "phenol and camphor" method of treatment [1].

Incidence of Cases.—The two main types of ringworm treated in this series were tinea cruris and tinea pedis. Tinea must be fairly widespread throughout the Service. The number of men treated to date amounts to 62 of whom 50 have been discharged as cured; the remaining 12 are the present in-patients. The total figure was made of 47 cases of *T. pedis* and 15 of *T. cruris*. One case of erythrasma and one case of ectothrix ringworm have also been treated.

Diagnosis in every case was checked microscopically but, owing to lack of facilities, it was impossible to culture on Sabouraud's medium. Of the 15 cases of *T. cruris* 8 had recognizable *T. pedis* running concurrently—the latter always being moderate in degree.

Preparation of Lotion.—The lotion used consisted of a "fifty-fifty" mixture of phenol and camphor prepared by melting a known volume of pure phenol, pouring it into a mortar, adding the proportionate amount of pure camphor and rubbing up the mixture until liquid.

Method of Application.—The lotion is most economically applied with a camel hair brush.

The skin must be dry; otherwise the phenol is liberated from its union with the camphor and burning occurs.

It is not necessary to dry with spirit—swabbing with cotton-wool is sufficient. Dressings, strapping and waterproof coverings are best avoided as they retain sweat. An exception to this rule is seen in those cases of *T. cruris* in which the scrotum is unaffected. Here a home made suspensory bandage can be utilized to protect the delicate scrotal skin.

Applications to healthy skin are symptomless. A certain amount of smarting appears usual during applications to patches of *T. cruris* though it is rarely intense and seldom lasts more than fifteen minutes. It is much less common in *T. pedis*. The more intense the infection, the larger the infected area, the more fissured the skin, the greater the smarting. Infected scrotal skin is most delicate in this respect but appears to be rid of infection most rapidly of all. Contact of serum or pus with the lotion does not appear to promote burning.

Tinea of the glabrous skin appears to be associated especially with excessive sweating. Consequently a rule was made that for half an hour

after applications the affected part should be exposed to the air without a covering of bedclothes, etc.

Treatment.—Intelligent nursing is definitely a requisite of rapid cure. Phenol is a substance which must be used with great care and discretion and the nursing staff must be fully trained in the detail of its use.

With these requisites in view, and remembering that rest is a first principle in the treatment of all inflammations, the routine used was to admit patients and treat them as bed cases—allowed to get up for bowel motions, etc., only.

The impression gained was that four applications a day produced a sufficiently constant high concentration of phenol for progress to be maintained at the optimum rate.

The danger of more frequent applications lies in the formation of small indolent-looking ulcers. These however heal in two or three days when covered by a strip of elastoplast and left undisturbed.

In the case of *T. cruris* it is advisable to apply the lotion first to the healthy skin beyond the periphery of the patch and then to work inwards. With such a technique there is less likelihood of missing a small portion of the growing edge as a result of hurried treatment.

The lotion causes the affected skin to flake—at first as a branny desquamation and later in flakes of increasing size.

These should be removed with ol. arachis or zinc cream, both of which have a beneficial effect on the smarting. In *T. pedis* the moist interdigital skin dries and should be peeled off so that each application subsequently is applied nearer to the zone of active infection and not to the covering umbrella of thick moist skin. The lotion is rubbed well in with the brush and the crusts are removed as far as possible without bleeding in chronic cases.

As would be expected the outermost cleft is the most stubborn and the others are (in general) healed a few days before it.

Results.—There have been no recurrences among the 15 cases of *T. cruris* discharged. Two cases of *T. pedis* have recurred mildly in the outermost digital cleft only but have cleared up as a result of subsequent treatment. It appears probable that these were discharged originally before absolute cure was obtained. The remaining patients show no signs of recurrence.

It is remarkable to note that as a result of treatment the infected portion is completely replaced by normal healthy epidermis and there is no scarring.

Cases of *T. cruris* received, on an average, 3.5 days of treatment with phenol and camphor; cases of *T. pedis* averaged 5.76 days' treatment.

The faster healing of *T. cruris* is probably an expression of the fact that infection is less deep-lying. Cases were not discharged until all traces of thick opaque skin had disappeared or, in cases of *T. cruris*, the scales produced in healing had fallen off leaving a homogeneously smooth,

non-spreading, non-irritating surface. The cost of treatment averaged 3d. per case. Bulk purchasing would undoubtedly reduce this even further.

Case 1.—One of the worst cases treated was that of W. H., a 33 year old man, who first contracted *T. pedis* at the age of 10. He had a very severe chronic bilateral infection extending over the soles of his feet and over the anterior aspect of the ankle-joints from between his toes. He had spent at least one-third of his Army career in various hospitals receiving treatment with Whitfield's ointment, etc. Owing to the condition of his feet he had been excused marching, P.T. and gun-drill throughout his two years' service. After thirty days' treatment he was discharged on August 7, 1942, with normal skin on his feet for the first time in twenty-three years. To date (September 27, 1942) after seven weeks of full duties including route marches, P.T., etc., he has no trace of recurrence.

Case 2.—C. R. C. was afflicted with bilateral *T. cruris* plus extension to both axillæ. Four patches (the minimum the size of a half-crown piece) extended from the level of his left knee to the dorsum of the foot and three patches of similar size were present on his right thigh. The fourth and third interdigital clefts of both feet showed moderate *T. pedis*. This was as intense and as widespread an infection as I have ever seen. The primary patch on the right thigh was 13 by 10½ inches—that on the left side was but little smaller. The armpits were almost completely affected. But after seven days' active treatment, with two subsequent days of observation, he was returned cured to his unit. He has had no further trouble.

Case 3.—Is quoted for its general interest and for the implied extension of the phenol and camphor treatment to cases of tinea other than that of the glabrous skin. R. J. W. was admitted on August 31, 1942, suffering from a well-developed kerion celsi (ectothrix), 65 mm. in diameter, situated in the left posterior triangle of the neck. Applications of cataplasma kaolin co followed by pasta mag. sulph. succeeded in inducing a free flow of pus from numerous follicular openings. Lotio phenol and camphor was then applied three times daily (kaolin and mag. sulph. being stopped). Within the first twenty-four hours all purulent discharge had cleared and the surface of the kerion celsi was dry and crusted. With subsequent applications the crusts became removable and the neck returned to its normal state. No burning occurred.

No toxic renal effects were observed throughout the series.

Conclusions.—There is reason to believe that ringworm of the glabrous skin is prevalent.

In trained hands lotio phenol and camphor appears to be a rapid, certain and cheap cure.

Certain details of treatment still remain to be worked out more fully.

A new field of investigation has been opened into the treatment of "dermatitis due to fungi."

I am indebted to Colonel James Rannie, *T.D.*, for his interest and W. B. Laird, for permission to publish I. I. Nelms, *R.A.M.C.*, and the remainder : and enthusiastic co-operation in treatment or her ready assistance in unravelling statistics.

Editorial.

PREVENTION OF VENEREAL DISEASE IN THE ARMY.

APART from battle casualties venereal disease represents one of the major causes of invalidity amongst soldiers, more particularly in the various stations and theatres of war overseas. Venereal disease can very largely be prevented and, if a really active policy is pursued, will be prevented. So far as venereal disease in a Force is a medical problem, and its prevention is by no means entirely a medical matter, responsibility rests with the D.M.S. who has on his staff a consultant or adviser in venereology who advises him, and a D.D.H. who functions on the executive side. Ultimately, of course, responsibility rests with the G.O.C. and down the chain of command to Os.C. units; the M.O. of any unit is adviser of the O.C., and much will depend on the advice which he gives and how it is implemented. One of the most important points to remember, and one often forgotten, is that the venereal disease rate amongst troops is usually proportional to the venereal disease rate in the local civilian population. The first active step, therefore, is to establish a close liaison with the civilian health authorities and, if necessary, put pressure on them to deal with infected civilians by such measures as closure of brothels, rehabilitation of prostitutes, tracing of contacts and the provision of adequate free treatment for all.

Venereal disease is almost invariably the result of promiscuity and young men living a communal life tend towards promiscuity unless their energies are directed into other and more desirable channels; this is more evident overseas than at home and more particularly in the East where soldiers are subject to the temptations of cafés, brothels, prostitutes, pimps and the like. The more important factors leading to promiscuity are, in the following order of importance, alcohol, lack of decent feminine society, more or less intimate contact with ladies of easy virtue as in solicitation, kissing, petting, etc., and boredom; additional ones are a sense of well-being arising from physical fitness, the idea that sexual intercourse is necessary for health, the influence of bad companions, fear of impotence and reaction following the strain and stress of active operations.

Any campaign against venereal disease must therefore take all these factors into consideration if the maximum success is to be attained. Of the active measures to be taken *education* comes easily first; it is amazing how ignorant the average layman is of venereal disease and this does not apply only to those who have had but an elementary education; many educated people still believe that gonorrhœa is contracted from lavatory seats and syphilis from cups, glasses, spoons and forks! Education should

include lectures, not only to the troops but to combatant officers and N.C.O.s, films and broadcasts. A small pamphlet on how to lecture is issued to all medical officers indicating the lines on which they should give their talks. Next to education comes discipline and all that it involves; there is no shadow of doubt that the venereal disease rate is always higher in an undisciplined unit and if the soldier knows that the contraction of venereal disease involves unpopularity and means letting his unit down, to say nothing of lowering its morale, he will think twice before running a risk.

Something like 60 per cent of all soldiers who contract venereal disease admit being more or less under the influence of alcohol at the relevant time; this drug clouds a man's judgment and removes inhibitions leading to the committing of acts which would never be performed in his more sober moments; the wines of the country are often very potent and those who imbibe them are little used to their effects. The man who is bored is more likely to succumb to temptation than the one who is fully occupied; every effort should be made to provide occupation for the men's spare time in the form of sports, games, cinemas, concerts, etc.; this is largely a matter for the Welfare Department but regimental officers can do much in their own spheres.

Having taught the soldier the necessity for continence, the dangers of promiscuity, what venereal disease is and what it may lead to, there remain the more positive measures which can be employed in those cases where, none the less, men will indulge. In general the policy is to encourage early personal disinfection *after* a possible risk. Overseas, condoms are provided free but they are neither issued nor forced upon the men. It has been claimed that the provision or issue of condoms encourages fornication but abroad, where most infections are from prostitutes, the question of birth control does not arise and it is felt that their value outweighs their disadvantages; they are not provided officially at home. Personal disinfection, particularly if carried out under skilled supervision and soon after an exposure, will prevent the development of gonorrhoea or syphilis in the vast majority of cases; its efficacy depends on the thoroughness with which it is carried out and how soon it is applied—every minute's delay matters. Preventive packets are available everywhere and instructions as to their use are enclosed; personal disinfection may be carried out in a P.A. room which should be established in every unit but is more satisfactorily performed in a P.A. centre staffed by trained orderlies.

Brothels are not a problem at home but they constitute a very serious one almost everywhere overseas. Most hygienists advocate their closure or the putting of them "out of bounds" but these solutions are not so simple as they appear. Closure of brothels means throwing their inmates on the streets unless measures are adopted for their rehabilitation; putting brothels "out of bounds" to troops is usually much more practicable and should be done wherever possible but in certain places this would mean

denying troops entry to those areas where there are shops, places of entertainment, etc., in other words virtually confining them to barracks or camps. Where such conditions prevail much may be done by the Military Police and a specially selected N.C.O. should be appointed to track down known infected women and bring them under treatment.

From the foregoing it will be seen that the problem is extremely involved and no single measure likely to be effective. It is only by a combination of measures adjusted to meet the needs of the situation of the particular area that effective action can be taken to reduce the incidence of venereal disease. The problem is much more serious overseas than at home and for this reason overseas conditions have been mostly considered. There we have a comparatively free hand but at home policy has always to be framed with a view to the objections which may be raised by moralists, many of whose strictures are founded on incomplete knowledge of the facts; the Army authorities have many times been accused of encouraging vice by "giving systematic instruction to all recruits in the prophylaxis of venereal disease." This expression can bear various interpretations but we certainly do not take the recruit directly he joins and teach him how he may fornicate in safety; what he is told is to "be good" and, if he can't be good, "be careful," i.e., carry out adequate personal disinfection immediately after exposure.

It has been truly said that the prevention of venereal disease is a moral problem with a medical side; it is only by attacking it from both directions that the best possible results will be achieved. Education and the maintenance of a high standard of both morals and morale represent the strategy and the elimination of infected persons and personal disinfection the tactics of the anti-venereal campaign.

Clinical and other Notes.

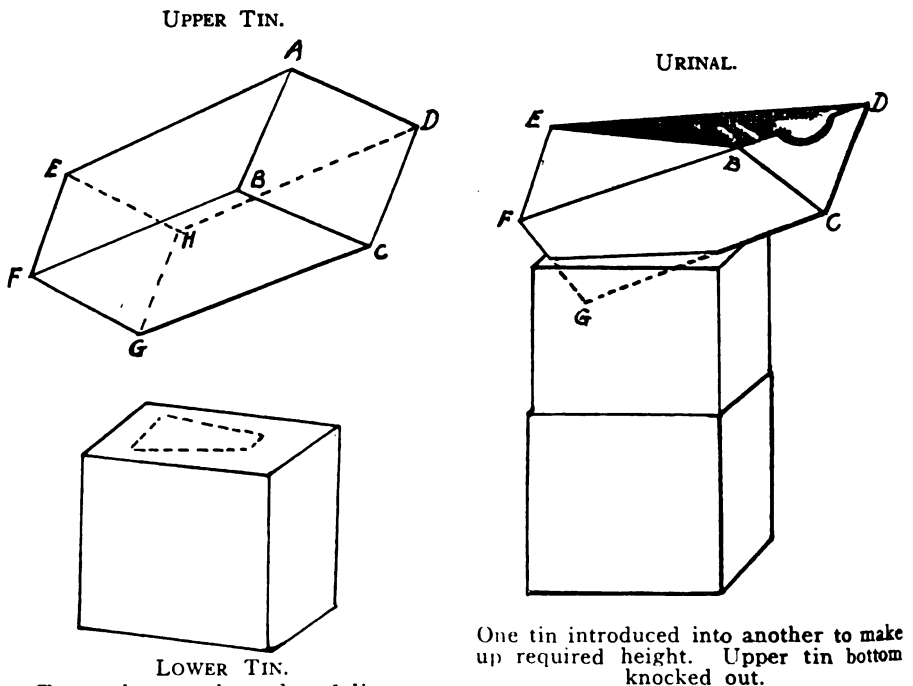
URINALS.

By H. J. M. C.

OWING to vagaries of present transport conditions the January, 1942, number of the Journal, No. 1, vol. lxxviii, has just been received.

In the article "Hygiene with a Force," whether a two gallon petrol tin or a four gallon kerosine tin is used and the way the upper tin for the urinal is cut is not quite clear in the text on page 31 or illustration on page 32.

A four gallon kerosine tin cut in the following manner serves the purpose



of a funnel admirably and has been used in various parts where the Army has served since 1918. A small model of it was placed in the Hygiene Museum, Millbank, in 1931. I do not suppose it is there now. It has not been described in any of the official War Office Hygiene or Sanitation manuals. It has functioned so well and it is so easy to construct that I make bold to send you a detailed description and a rough sketch.

A two gallon petrol tin would function equally well but not as well as a four gallon kerosine tin.

(i) Cut the top of the tin diagonally across from B to D leaving the handle attached if possible (see sketch).

(ii) Cut one side diagonally from E to B.

(iii) Cut the adjacent side diagonally from E to D.

(iv) Discard the triangular piece of tin cut off.

(v) Perforate the corner at "G" with small holes from within outwards with an average sized nail or point of a bayonet or kukri.

(vi) Place this tin at an inclined angle on the lower tin, the bottom of which is complete if required as a receptacle for the urine, or knocked out if required to be placed over a soak pit or introduced into another tin in order to increase the height of the urinal to a more convenient level. The top tin must be anchored to the bottom by wire in localities subject to storms and wind.

Paint the outside of the tin with white wash; the inside of the tins, especially the topmost one, with black crude oil in order to preserve the inside from rusting as well as to serve as a better target at night.

The whole thing can be constructed by any individual with a clasp knife, bayonet or kukri and needs no tinsmith or other expert artisan.

A DEVICE TO REPLACE THE WALKING IRON IN PLASTER CASES.

BY LIEUTENANT-COLONEL J. LAWSON,

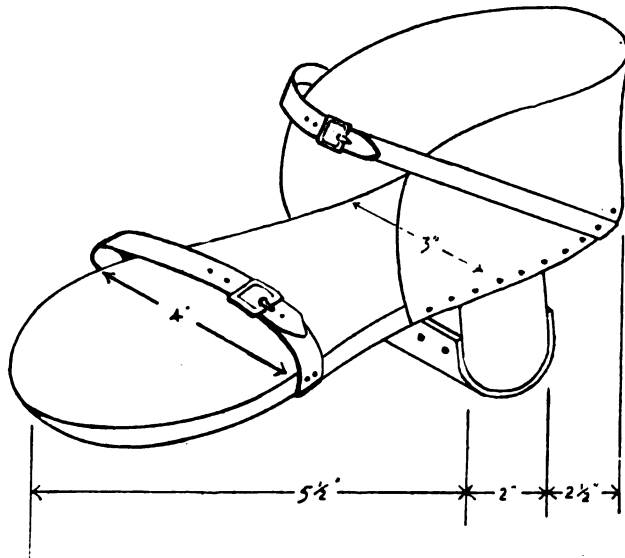
Royal Army Medical Corps.

THE experience which has been gained in dealing with a large number of soldiers fitted with lower limb plasters and walking irons has shown that the Bohler walking iron is in the majority of Service cases unsatisfactory. The chief drawbacks are the bending sideways of the projecting portion, the fracture of the iron at the point where it is drilled and the damage which it is apt to do to bedding. It may be that the first two objections are more often seen in Service patients who are on their feet more and rest less than civil patients and who are required to do a form of physical training which, although specially designed for them, is quite energetic.

Various alternatives to the Bohler iron have been tried out. For example, a simple plaster heel has been used and, while satisfactory in wards, wears down much too quickly on pavements or when subjected to water as on muddy ground. A wooden heel fixed with plaster bandages is more satisfactory but leaves the front sole of the plaster exposed to wet and is apt to work loose while, if the sole of the plaster is at all yielding, the pressure exerted may be too localized. A wooden sole with wooden heel affixed

with plaster bandages has also been used but in all these alternatives the patient has to take his "muddy boot" to bed with him.

The device now adopted is a wooden sole and heel which can be detached at night. This "sabot" can be made from scrap materials by a semi-skilled carpenter. The sole is 9, 10 or 11 inches long, 4 to 4½ inches wide at the base of the toes, tapering to 3 to 3½ inches at the heel. It is of ½ inch wood bevelled at the toe. The heel is a 2-inch cube fixed with screw nails. It is slightly rounded on the walking surface and, when possible, tipped with rubber. A short "upper" made of tin or other stiff material is nailed to the rear portion of the sole. The sabot is retained in position by a strap across the front of the plaster behind the toes and a second strap



from the heel forwards across the front of the ankle. This latter strap retains the upper in position.

In cases in which it is intended to use the sabot the plaster sole should be made flat without an inclination to either side so that the sole fits snugly and without tilting. The patient wears a sock over the plaster beneath the sabot.

The men fitted with this sabot walk easily, do not notice the slight additional weight and, in most cases, prefer it to any other walking device.

The use of wood in constructing the sabot results in rather a clumsy appearance which, if light metals such as duralamin were available, would be obviated.

The drawing gives an idea of the type of article aimed at but modifications continue to be made in the light of experience and depending on the materials available.

CASE OF A GUNSHOT WOUND OF STOMACH AND DUODENUM
WITH RECOVERY.

BY CAPTAIN W. J. C. CRISP,
Royal Army Medical Corps.

PRIVATE C. age 27 was accidentally shot by a bullet from a .45 Service revolver at a distance of 4 feet on December 23, 1942, at 6.55 a.m. and admitted to a Field Hospital at 8 a.m.

When examined he was in great pain and had vomited black fluid several times. The bullet entrance wound was 3 inches above the umbilicus. There was no exit wound and the bullet was felt under the skin of the back to the left of the 4th lumbar vertebra. There was marked rigidity and tenderness of the abdomen. B.P. 100 systolic. Pulse 100. Respirations shallow and costal. A pre-operative diagnosis of perforating wound of the stomach was made. He was given morphia gr. $\frac{1}{4}$ and atropine gr. $\frac{1}{100}$ and preparations made for immediate operation.

At 9.45 a.m. operation was commenced. The abdomen was opened by a left paramedian incision and the entrance wound excised. Blood gushed out and this was seen to arise from a wound of the mesentery of the small intestine. Bleeding which was coming from a large mesenteric vein was stopped by grasping the root of the mesentery between the fingers. The vein was ligated and blood cleaned out of the peritoneal cavity. The bullet, which had perforated (1) the stomach close to the greater curvature; (2) the transverse mesocolon; (3) the root of the mesentery of the small intestine; and (4) the third part of the duodenum close to the duodeno-jejunal junction, had finally left the abdominal cavity by piercing the posterior peritoneum close to the left ureter 1 inch to the left of the body of the 4th lumbar vertebra where it had remained. The duodenum and upper 2 feet of the jejunum were dilated and their walls engorged with blood. The duodenal perforations were sewn up in two layers and the holes in the mesocolon and mesentery of the small intestine closed. The anterior hole in the stomach was sewn in two layers after trimming the edges. The posterior hole in the stomach was approached by incising the gastro-colic omentum and then sutured. The abdomen was closed without drainage. During the operation the B.P. fell to 70 mm. systolic and two pints of serum were given and later one pint of blood.

After operation the patient was put in Fowler's position, and continuous intravenous drip saline was given for five days. A duodenal tube was passed nasally to keep the duodenum and stomach empty. This was kept *in situ* for three days and fluid was withdrawn every half hour. M & B 693, $\frac{1}{2}$ gm., three times a day, was given. Twelve hours after operation the B.P. was 115 systolic. Except for a rigor after saline intravenously he made an uninterrupted recovery and should be fit for service in three months' time. The bullet was removed under local anæsthesia fourteen

days after operation; it was found to be a .45 soft lead type and had evidently hit the left side of the lower border of the 3rd lumbar vertebra.

Comment.—Gunshot wound of the stomach and duodenum is usually fatal from shock and hæmorrhage or, later, from duodenal fistula. This man's recovery may be attributed to: (1) Operation being performed within six hours of the injury. (2) Nothing having been given by mouth for five days and continuous saline given intravenously for the same period. (3) The duodenum being kept empty by continuous aspiration. Thus paralytic ileus and duodenal fistula were not encouraged.

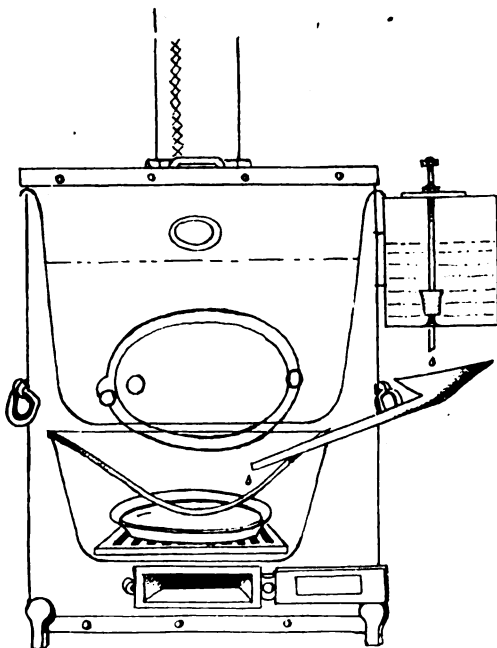
I should like to thank Lieutenant-Colonel J. W. Eames, R.A.M.C., for permission to publish this case.

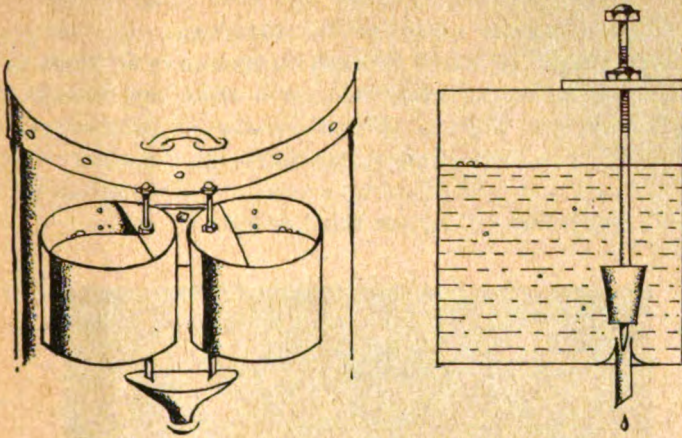
METHOD OF HEATING A SOYER STOVE BY OIL AND WATER FLASH PAN.

BY LIEUTENANT-COLONEL J. L. WARNER,
Royal Army Medical Corps.

THE following method has been devised by Lieutenant F. O. Moore, R.A.M.C., and is in use in this unit.

Two seven-pound jam-tins are fixed together with a piece of scrap metal and a D section of the lid of each is left in position. Into a hole in the bottom of each a piece of $\frac{1}{8}$ inch bore brass tubing $1\frac{1}{2}$ inch long is soldered





A skewer is attached to a $\frac{1}{4}$ inch bolt and fixed by a $\frac{1}{4}$ inch nut to the D of the lid so that the point of the skewer can be screwed into the brass tubing.

A cork is placed on the skewer to close the tubing when the skewer is screwed down. The two tins are attached to the top of the side of the Soyer by a bolt.

Below the two tins a funnel, made from a four-gallon petrol-tin, with a tube 12 inches long, is inserted through a hole bored in the side of the Soyer so that the end of the tube is above the pan which is placed in the fire-box.

The oil and water are allowed to drip in the ordinary way controlled by the micrometer screws.

Soyers full of water can be boiled in twenty-five minutes.

CALCIUM CARBONATE GALL-STONES.

BY LIEUTENANT-COLONEL E. V. WHITBY,

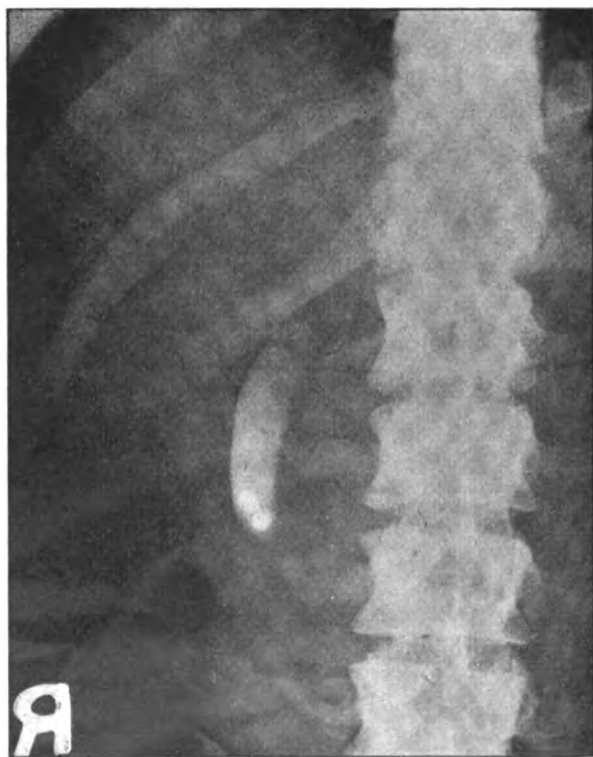
Royal Army Medical Corps.

A SOLDIER, aged 30, was sent to me for a contrast meal examination with the following history:—

Quite well up to six months ago when he had a sudden attack of severe abdominal pain above the navel with diarrhoea. This lasted for about a week. During the next two or three months he was quite clear from any diarrhoea or discomfort. He then had another similar attack which lasted for about the same time. A third attack started about a month ago when the diarrhoea was more severe and the character of the pain changed from being sharp to that of an ache. He complained of these symptoms up to the time of the examination. There has been no pain or discomfort related

to meals, no jaundice, and his appetite has been good except during the attacks. The predominant symptom was diarrhoea. No history of previous illness apart from an attack of amœbic dysentery in India in 1935.

At the radiological investigation two small dense opacities were seen in the right hypochondriac region. These appeared to have smooth borders and a structure that exhibited fine linear markings radiating outwards. A lateral view showed that both these opacities were situated anteriorly, well in front of the spine, thus ruling out renal origin.



Cholecystograms.—P—A and lateral views demonstrated these opacities in the gall-bladder. In a straight film the upper opacity proved to be a gall-stone in the cystic duct for, at operation, one of the gall-stones was found to have returned to this position.

A laboratory report on one of these calculi read as follows:—

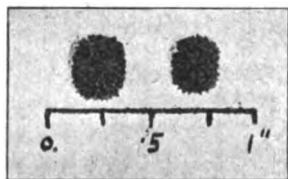
Physical Examination.—Size 6 mm. by 5 mm., roughly an oblong spheroid, olive-green, thickly covered with tiny sharp spicules. Weight 150 mg. Volume 1 c.c. On section the spicules appear to extend half-way to the centre of the stone. No lamination was observed. The stone was easily crushed.

Chemical Examination.—Calcium salts accounted for 83·2 per cent of

the weight of the stone. Of these salts, 98 per cent consisted of calcium carbonate, 2 per cent of calcium phosphates. No cholesterol was found and, though the stone was obviously stained with bile, bilirubin could not be detected chemically. The remaining 16.8 per cent of the weight of the stone consisted presumably of water and traces of organic matter.

Gall-stones composed almost entirely of calcium salts are supposed to be very uncommon.

Peter Kerley in the Textbook of X-ray Diagnosis by British Authors



states: "Occasionally gall-stones are seen which may be composed of about 90 per cent calcium carbonate and 10 per cent cholesterol. These stones are of two types, white and green. The white ones are soft and associated with obstruction of the cystic duct, the green ones contain copper in addition to calcium carbonate, and are associated with general metabolic disturbance. Calcium carbonate stones are rare. They are usually single and round or barrel-shaped."

I am indebted to Dr. J. M. L. Burtenshaw of the Staffordshire Bacteriological and Pathological Laboratory for the laboratory report.

Current Literature.

HUANG, Y. W., SHEN, T. H. & TANG, F. F. **A Note on the Re-Utilization of Used Agar-Agar as an Emergency Culture Medium.** *Chinese M. J.* 1941, Feb., v. 59, No. 2, 176-8. [Summary appears also in *Tropical Diseases Bulletin*.]

Agar-agar is an extract of the seaweed *Gelidium corneum* and under present circumstances it is not easy to obtain supplies. The authors have experimented to find out whether it could not be used more than once. Their investigations led them to conclude that poor growths or failure of bacteria to grow on used medium sterilized were due not so much to lack of growth-promoting material as to inhibiting substances left over from previous cultivation. They therefore cut the used and resolidified agar into thin slices, placed them in covered bamboo baskets and the baskets into a running stream for twenty-four to forty-eight hours, for thorough washing. Better results were thereby obtained, but repeated autoclaving—14 or 15 pounds pressure sterilizations—gradually removes the property of solidifying on

cooling, but by the addition of fresh agar, 1 part to 2 of washed agar, this was overcome. The authors now use the following formula:—

Washed agar-agar (3 per cent)	...	...	...	8,000	gram.
(containing 240 grm. dry agar)					
Fresh agar-agar	...	...	...	120	gram.
Sodium chloride	...	...	...	40	gram.
Sodium carbonate	...	...	...	25	gram.
Liver digest broth	...	...	...	2,000	c.c.
Meat infusion broth	...	...	...	2,000	c.c.

“Sodium carbonate was added to neutralize the acidity which is apt to run very high after the agar was washed. Liver digest and meat infusion broth were used to supply peptone and other essential factors.”

Repeated growth of the enterica group and of *V. cholera* has been obtained on this, without the production of any recognizable change in morphology, cultural characteristics, serological reactions or colony formation. It is good as an emergency medium for producing vaccines.

H. H. S.

Reprinted from "Bulletin of Hygiene," Vol. 16, No. 9.

Reviews.

THE PRINCIPLES AND PRACTICE OF WAR SURGERY. By J. Trueta, M.D.
London: Hamish Hamilton Medical Books, in conjunction with
William Heinemann Medical Books, Ltd. 1943. Pp. xvi + 391.
Price 42s. net.

This book is full of sound common sense, written by a man who has tried out his methods in front line emergency surgery and later has had the advantage of seeing the final results. No longer is the encasing of the infected wound in a closed plaster an empiric treatment but, as his vast bibliography and laboratory findings prove, a method founded on a biological basis. No personal claims are made by the author for the methods described but the modifications devised by Winnett Orr and himself on the original technique of Ollier, 1870, are described in detail.

The considerable experience of the author on the side of the Republicans in the Spanish War and the facilities to carry on his work, both practical and experimental, in Oxford, make the book an authoritative reference work. The chapters on anæsthesia, blood transfusion, antiseptics, burns, skin grafting and chemotherapy are short but full of practical detail. Tetanus, gas gangrene and the general streptococcal infections are given a balanced relationship and shown as part of a general infection rather than separate entities totally unrelated as most textbooks try to make them.

Most helpful are the many suggestions in organization covering both work in the field and the surgery of the bombed town. It should be read

by all administrative officers and is invaluable to all surgeons, anæsthetists and resuscitation officers. The necessarily close connexion which must exist with the laboratory is continually stressed.

This compact, single-author book in 390 pages covers in one comfortable volume what many poly-author volumes have failed to do. The print, paper, illustrations and format leave little to be desired and, although it alleges on the cover that the book is produced in "conformity with authorized economy standard," we still find a strong cloth back with the usual protecting dust cover—perhaps some economy here might have enabled the printers, Hamish Hamilton and Heinemann, to reduce the price to less than two guineas.

REGIONAL ANALGESIA FOR INTRA-ABDOMINAL SURGERY. By Norman R. James, L.R.C.P. & S.Ed., D.A. London: J. & A. Churchill, Ltd. 1943. Pp. vi + 57. Price 6s.

This little book is a welcome addition to our all too scanty literature on local anæsthesia. It is well turned out and the illustrations are excellent. The author recommends the use of amethocaine hydrochloride for producing local anæsthesia. Better known as pontocain or decicain, this drug has not up to the present been largely used for infiltration or nerve block anæsthesia. Having a toxicity $4\frac{1}{2}$ times greater than procain, it nevertheless compares favourably with it in the strength—0.1 per cent or less—in which it is used. Theoretically 100 c.c. of 0.1 per cent anethaine should be less than half as toxic as 100 c.c. of 1 per cent procain. Whether this is in fact a true representation of its effect on the human body the author does not say. A further advantage is that anethaine anæsthesia lasts considerably longer—for at least three hours.

Several references are given in the section on pharmacology and one would wish that this practice had been followed throughout the book.

The description of his equipment and its layout is good, as also are the instructions for preparation of the analgesic solution and positioning of the patient for injection.

Many anæsthetists will not agree with the heavy dosage of omnopon recommended: To give grains $1\frac{1}{2}$ intravenously for a poor surgical risk, even though it be a young adult male, seems to be courting trouble, and the author's cautions and the recommendation to give the drug slowly are very necessary. Omnopon in sufficient quantity to cause anoxia of such a degree as to need correction by the inhalation of oxygen is hardly a safe procedure: the author appears to find it necessary to administer oxygen to many of his patients.

The intercostal block is well described and none could fail to follow every detail of the method which the author recommends. There may be some who prefer the method of paravertebral anæsthesia described by Labat, in which the rami communicantes are blocked at the same time as the intercostals, thus avoiding the posterior approach to the splanchnic ganglia.

Another particularly good section of the book is that on positioning the patient for operation.

The author's experience with surgeons will not, we hope, be that of many of his readers; but it is to be noted that it is only of his own experience which he speaks. We cannot agree with him when he says that a good surgeon always takes kindly to regional anæsthesia, inferring that those who do not do so are bad surgeons; many first-class operators prefer to have their patients asleep.

In the section on war surgery he speaks without first-hand knowledge. His methods would be excellent for quiet times but we do not think he realizes what work in a C.C.S. or a General Hospital is like when casualties are pouring in. The difficulties of cleaning up cases which arrive direct from the battle-field and of maintaining the sterility of his impedimenta would be wellnigh insuperable and the time and peaceful atmosphere necessary for the delicate manœuvres required in this type of anæsthesia make it an impracticable proposition.

His remarks on di-ethyl ether, especially with regard to Service conditions, are not borne out in practice. It was used in many hundreds of cases in France during this war with success. Very small amounts were needed for badly wounded patients and the ill-effects were conspicuously few; nor can we agree that in the Services anæsthetic-resistant patients are the rule and not the exception.

His remarks directed at an apparatus which has been presented to the Services in large numbers by a very great philanthropist we regard as unfortunate.

This is a book which will find great usefulness. In future editions we venture to hope that the author may see fit to modify those sections we have criticized, which, whilst they have no part in the main theme, may serve to mar the pleasure many will find in reading his book. E. S. R.

SHIPWRECK - SURVIVORS. A MEDICAL STUDY. By Surgeon - Captain MacDonald Critchley, R.N.V.R. London: J. & A. Churchill, Ltd. 1943. Pp. vii + 119. Price 7s. 6d.

It is but seldom that in reviewing a medical work we are forced to borrow the cliché of the reviewer of fiction and to state that here is a work of enthralling interest; but, if we used a less enthusiastic phrase we would be doing an injustice to this book and to its author.

Technically, it is very difficult to combine anecdote with science and Surgeon-Captain Critchley is to be congratulated on the competent manner in which he has recorded a multitude of stories of shipwreck and has related each of these to some objective scientific deduction or fact. The difficulties inherent in such an approach to the subject might well have dismayed a less capable author but, in his selection and use of the logs, journeys and stories of survivors, Captain Critchley has used a very wise discretion and has succeeded in maintaining a perfect balance between narrative and medicine.

At the beginning of the book are illustrations of fish bites, salt-water dermatitis, immersion foot, and a series of skiagrams showing the effects of frost bite. Then follows a chapter on the effects of cold, succeeded by chapters concerning thirst, hunger, tropical hardships, the psychological aspects of shipwreck and survival in small boats and, finally, the prevention and treatment of the various disabilities and injuries which are part of the hazards of life in an open boat. The volume is terminated by a full bibliography the value of which is enhanced because of its sub-division into sections, each having a subject heading.

It is not seemly for a military critic to comment on work which is predominantly concerned with naval medicine but it is interesting to note that whereas many authorities regard trench foot as being a form of immersion foot, Surgeon-Captain Critchley believes that the former state should be considered as a pathological condition midway between frost bite and immersion foot. Nevertheless, despite our reluctance to interfere in matters predominantly naval, we warmly recommend this book to our readers. It contains the answers to many questions which we have not previously seen discussed so logically, e.g., is it safe to drink sea-water diluted with fresh water? What happens with regard to defæcation in a life-boat? Is it safe to drink urine? What are the differences between the mass delirium of a group of persons isolated in a boat and other delirious states? How may men just rescued from the sea best be treated?

On some occasion, "because of the dangers of the sea and the violence of the enemy," some of us may be forced to regard these questions in a less theoretical manner than we do at present. Because they may find the information contained in the volume to be of inestimable value, it is our considered opinion that all potential voyagers should read this book.

Notices.

VISITORS' BOOK, ROYAL VICTORIA HOSPITAL, NETLEY.

THE original (pre-1917) "Visitors' Book" of the Royal Victoria Hospital, Netley, cannot be found.

This was of considerable historic interest and was kept in a glass-topped case in the Main Hall.

It is reputed to have last been seen about 1928 with many of the original signatures of Royalty, etc., cut out.

Will any serving or retired officer of the Corps who has any recollection of the said book or knowledge as to its present whereabouts kindly communicate with the Officer Commanding, Royal Victoria Hospital, Netley.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.

MR. H. H. GERRANS, F.C.I.S., has been appointed Secretary of the Royal Institute of Public Health and Hygiene.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in **duplicate** through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office, P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps, and articles of a non-scientific character, may be accepted for publication under a *nom-de-plume*.

All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps," will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

A free issue of twenty-five reprints, or any lesser number to the extent applied for, will be made to contributors of Original Communications and of twenty-five excerpts, or any lesser number as above, in the case of Lectures, Travels, Clinical and other Notes, and Echoes of the Past. Such free reprints or excerpts will, however, only be sent to those specifying their wish to have them and a request for same should accompany the article when submitted for publication, stating the number of reprints or excerpts required.

Reprints or excerpts, additional to the above, can be furnished on payment if specially ordered at the time of submission of the article for publication.

Except as in the first paragraph above, communications in regard to editorial business should be addressed—"The Editor, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, A.M.D.5, War Office, Whitehall, S.W."

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OF THE

ROYAL ARMY MEDICAL CORPS

Corps News.

JULY, 1943.

EXTRACTS FROM THE "LONDON GAZETTE."

June 15, 1943.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North Africa:—

The Distinguished Service Order.

Capt. James Watt Logan, M.B. (†188966), Royal Army Medical Corps (Glasgow).

The Military Cross.

Capt. John Dickson Dow (199847), Royal Army Medical Corps (Glasgow).

Capt. Eric James Kerr, M.B. (185633), Royal Army Medical Corps (Worthing).

Lt. Ringland Gilmour Boyd, M.B. (227634), Royal Army Medical Corps (Garvagh, Co. Londonderry).

The Distinguished Conduct Medal.

No. 7373608 S/Sjt. Eric George Stevens, Royal Army Medical Corps (Barnet).

The Military Medal.

No. 7395054 Cpl. Ernest Hardie, Royal Army Medical Corps (Stockport).

No. 7387550 Cpl. (acting Sjt.) George Albert Jones, Royal Army Medical Corps (Cardiff).

No. 7380110 Cpl. James Holt, Royal Army Medical Corps (Goole, Yorks).

No. 7359982 Pte. (acting Cpl.) Leonard Bracegirdle, Royal Army Medical Corps (Manchester).

June 17.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the Middle East:—

The Military Cross.

Capt. (temp. Major) William Annan Heggie (96612), Royal Army Medical Corps (Glasgow).

Capt. Paul Stuart Barclay (199944), Royal Army Medical Corps (Haywards Heath).

Capt. Frederick Hatelv Edwards (135678), Royal Army Medical Corps (Cardiff).

Capt. Norman Gill (125318), Royal Army Medical Corps (Wakefield, Yorks).

Capt. Lawson Gray Harper (136385), Royal Army Medical Corps (Glasgow, W.2).

Capt. Kevin Francis Patton (111780), Royal Army Medical Corps (Mullinger, Eire).

June 24.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in the Middle East during the period May 1, 1942, to October 22, 1942:—

Commands and Staff.

Brig. (temp.) C. Crawford-Jones, C.B.E., M.B. (4865), late R.A.M.C.

Brig. (temp.) J. Walker, C.B.E., M.C., M.B. (4310), late R.A.M.C.

Col. E. Scott, D.S.O., T.D., M.D. (25990), late R.A.M.C.

Royal Army Medical Corps.

Brig. (local) J. A. Sinton, V.C., O.B.E. (154437).

Col. W. H. Kerr, T.D., M.D. (25972).

Col. (acting) L. M. Rowlette, D.S.O., M.C. (15764).

Lt.-Col. D. Crellin, M.C. (1645).

Major (temp. Lt.-Col.) A. C. Armstrong, M.B., F.R.C.S. (63068).

Major (temp. Lt.-Col.) D. L. C. Bingham, M.B., F.R.C.S. (Edin.) (73696).

Major (temp. Lt.-Col.) J. H. Dunn, M.D., M.R.C.P. (40015).

Major (temp. Lt.-Col.) J. B. George, M.B. (52438).

Major (temp. Lt.-Col.) H. G. Kirwan-Taylor, M.B., F.R.C.S. (127645).

Major (temp. Lt.-Col.) R. R. Leaning, O.B.E. (41300).

Major (temp. Lt.-Col.) J. T. Lewis, M.D., F.R.C.P. (127140).

Major (temp. Lt.-Col.) C. I. N. Morgan, M.B., F.R.C.S. (188279).

Major (temp. Lt.-Col.) A. N. B. Odbert, M.B. (42438).
 Major (temp. Lt.-Col.) D. U. Owen, M.D., M.R.C.P. (75838).
 Major (temp. Lt.-Col.) T. McK. Robb (62921).
 Major (temp. Lt.-Col.) W. H. Scriven (30088).
 Major (temp. Lt.-Col.) A. Simpson-Smith, F.R.C.S. (101028).
 Major (temp. Lt.-Col.) V. C. Verbi (41310).
 Major G. M. Curtois (72156).
 Capt. (temp. Major) J. Amos, M.B. (103123).
 Capt. (temp. Major) J. B. Bamford (108101).
 Capt. (temp. Major) H. B. Craigia, M.B. (115975).
 Capt. (temp. Major) W. S. Gale, M.B. (87626).
 Capt. (temp. Major) R. S. Handley, M.B., F.R.C.S. (93910).
 Capt. (temp. Major) J. M. Henderson, M.D. (127196).
 Capt. (temp. Major) C. R. Lane, M.D. (146955).
 Capt. (temp. Major) N. A. Lawler, M.B. (101987).
 Capt. (temp. Major) R. B. Martin, M.D. (87914).
 Capt. (temp. Major) J. H. Mayer (69528).
 Capt. (temp. Major) J. J. McCarthy, M.B. (188296).
 Capt. (temp. Major) J. W. F. Munden (71507).
 Capt. (temp. Major) M. W. C. Oldfield, M.B., F.R.C.S. (44832).
 Capt. (Qmr.) (temp. Major) F. G. Summers (56542).
 Capt. (temp. Major) G. M. Willoughby (135591).
 Capt. (Qmr.) (acting Major) D. A. R. Youngson (89524).
 Capt. (Qmr.) (local Major) T. Walklev (56906).
 Capt. L. J. Blav, M.B. (106034).
 Capt. J. Brennan, M.B. (99443).
 Capt. W. R. S. Doll, M.R.C.P. (79321).
 Capt. A. A. Evangelides, M.B. (185948).
 Capt. A. P. Grant, M.B. (173008).
 Capt. H. A. Koretz (136045).
 Capt. D. D. Muir (123108).
 Capt. H. M. Pickard (135835).
 7262552 W.O.II (Q.M.S.) J. H. Kevan.
 7259241 W.O.II (Q.M.S.) J. J. Quinn.
 7523513 S/Sjt. (acting W.O.II (Q.M.S.)) C. F. Stone.
 7261561 S/Sjt. W. Colvin.
 7523218 S/Sjt. L. Hume.
 7356654 S/Sjt. A. W. Lindow.
 7260734 S/Sjt. H. Owen.
 833743 Sjt. (acting S/Sjt.) J. Tate.
 7360573 Sjt. D. Ashburn.
 7266434 Sjt. S. T. Barber.

7520110 Sjt. P. W. Benson.
 7261383 Sjt. R. Birmingham.
 7359058 Sjt. J. S. Cave.
 7259587 Sjt. D. Davies.
 7263555 Sjt. T. E. Davies.
 7354873 Sjt. J. Fairclough.
 7523973 Sjt. E. Foster. (Since died.)
 7366538 Sjt. L. F. Gapper.
 7259319 Sjt. E. Hukin.
 7260723 Sjt. H. G. Jones.
 4533920 Sjt. A. Kellett.
 7517705 Sjt. T. H. Lamb.
 7256562 Sjt. H. J. Outram.
 7517990 Sjt. R. T. L. Potts.
 7249838 Sjt. R. Reed.
 7535247 Sjt. H. Roach.
 7258719 Sjt. C. Scull.
 7262953 Sjt. G. A. Y. Stephenson.
 7258963 Sjt. J. W. Walton.
 7358753 L/Sjt. A. R. Carter.
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 7518869 Cpl. W. Greig.
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 7523192 Cpl. H. A. Holder.
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 9703056 Pte. S. A. Miller.
 7379646 Pte. R. Parker.
 7389981 Pte. G. Porter.
 7386082 Pte. S. L. V. Rescanieres.
 7370989 Pte. J. Roberts.
 7518233 Pte. B. Smalley.
 7383555 Pte. A. Wilson.

The Army Dental Corps.

Capt. (temp. Major) R. V. P. Campbell (114714).
 Capt. (temp. Major) E. J. Dalling (35482).
 Capt. C. H. Straughan (125496).
 7536359 W.O.II (Q.M.S.) K. C. Dav.
 7536332 S/Sjt. E. Moore.
 7536119 Sjt. (acting S/Sjt.) H. D. Williams.
 7538583 Cpl. C. J. Atkin.
 7538648 Cpl. G. H. Cave.
 7536421 Cpl. S. Collings.

Queen Alexandra's Imperial Military Nursing Service.

Miss M. A. Beardall, Sister (206040).
 Miss A. J. Breakell, Sister (206723).
 Miss D. I. Carter, Sister (208183).
 Miss H. Cunneen, Sister (208172).
 Miss A. M. Harvey, Sister (208447).
 Miss G. M. Petlev, Sister (209019).

Miss G. A. Robins, Sister (209172).
Miss D. G. Thorp, Sister (206479).

June 24.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in Malta during the period May 1 to October 22, 1942.

Royal Army Medical Corps.

Major A. C. Crawford, T.D., M.B. (27803).

Capt. (Qmr.) (temp. Major) F. H. Newland (6636).

Lt. J. C. B. Whycherlev (211808).

7391762 L/Sjt. W. G. Wilson.

7390856 Cpl. T. Dolly.

July 8.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in East Africa and Madagascar:—

To be Additional Commander of the Military Division of the said Most Excellent Order:—

Brig. (temp.) Evelyn Alexander Sutton, O.B.E., M.C. (8525), late Royal Army Medical Corps.

July 8.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the Middle East:—

The Distinguished Service Order.

Major (temp. Lt.-Col.) Henry Joseph Roberts Thorne, M.B. (51399) Royal Army Medical Corps (Worcester).

Major (temp. Lt.-Col.) Cecil Hugh Kerr, M.D. (99413), Royal Army Medical Corps (London, N.21).

The Military Cross.

Capt. Thomas Reilly, M.B. (114190), Royal Army Medical Corps (Bonnybridge, Stirling).

July 8.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North Africa:—

The Military Cross.

Capt. Hugh Morton MacFie, M.B. (216202), Royal Army Medical Corps (Glasgow, W.2).

Capt. William Robinson, M.B. (216693), Royal Army Medical Corps (Wakefield).

Capt. John Francis Webb, M.B. (202345), Royal Army Medical Corps (Chester-le-Street, Durham).

The Military Medal.

No. 7382262 Pte. Richard Alexander Fishwick, Royal Army Medical Corps (Bradford).

July 8.—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in East Africa and Madagascar:—

The Military Medal.

No. 7349481 S/Sjt. James Henry Puzey, Royal Army Medical Corps (Leeds).

July 8.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in East Africa and Madagascar:—

Royal Army Medical Corps.

Col. (temp.) B. C. O. Sheridan, M.C., M.B. (8749).

Capt. (temp. Major) W. N. Hood, M.B. (110679).

Capt. G. C. Griffiths, M.B. (133674).

Capt. R. H. Isaac (159929).

Capt. W. H. Whyment, M.B. (128688).

7260305 W.O.I (S.M.) J. Rayburne.

7816955 Sjt. A. E. Raisborough.

The Army Dental Corps.

7536273 S/Sjt. J. G. Campbell.

July 9.—The KING has been pleased to grant unrestricted permission for the wearing by the undermentioned of the decorations indicated against their respective names which have been conferred upon them by the President of the Republic of Poland, in recognition of services during the War:—

Order of Polonia Restituta, Third Class.

Lt.-Col. and Professor F. A. E. Crew, T.D., F.R.S., F.R.S.E., M.D., F.R.C.P. Edin.

June 25.—The KING has been graciously pleased to sanction the following promotions in, and appointments to, the Venerable Order of the Hospital of St. John of Jerusalem:—

As Officers (Brothers).

Col. Peter John Ryan, M.C., M.B.

Lt.-Col. Charles Alexander Whitfield, R.A.M.C.

Lt.-Col. Alfred Edward Campbell, R.A.M.C.

Major Ian Alfred Anderson, R.A.M.C.

June 15.—Col. (temp. Brig.) R. K. Mallam, O.B.E., M.B. (8027), late R.A.M.C., on completion of four years in the rank, is retained on the Active List supern. to estabt., June 14, 1943.

Col. D. T. M. Large, M.B. (1344), late R.A.M.C., on completion of four years in the rank, is retained on the Active List supern. to estabt., June 15, 1943.

Lt.-Col. (temp. Col.) G. S. McConkey, O.B.E., M.D. (1249), from the R.A.M.C., to be Col., June 15, 1943, with seniority from June 6, 1940.

Royal Army Medical Corps.

The undermentioned Majors to be Lt.-Cols. :—

J. A. C. Kidd (5801), June 14, 1943.

G. H. Barry, M.B. (5825), June 15, 1943.

June 18.—Capt. A. H. T. F. Fullerton (65324), h.p. list (late R.A.M.C.), retires on ret. pay on account of ill-health, June 19, 1943, and is granted the hon. rank of Major.

Royal Army Medical Corps.

June 25.—The undermentioned to be Majors :—

June 7, 1943.—Capt. (temp. Major) R. H. Foster, M.B. (44473).

Capt. (temp. Major) D. T. Swift, M.B. (63170).

Capt. (War Subs. Major) W. M. E. Anderson, M.B. (63162).

The undermentioned short service offrs. are appointed to permanent commns. retaining their present seniority :—

April 1, 1943.—Capt. (temp. Major) W. A. Mack D. Scott, M.B. (73566).

April 11, 1943.—Capt. J. McGhie, M.B. (73569).

May 1, 1943.—Capt. (temp. Major) W. G. Macfie (75591).

Capt. (temp. Major) M. M. Medine (75594).

Capt. (temp. Major) A. W. Box, M.B. (75649).

May 9, 1943.—Capt. W. J. A. Craig, M.B. (75670).

Memoranda.

The undermentioned Consultants are granted the local rank of Brig., May 18, 1943 :—

Acting Col. A. S. Daly (119904).

Acting Col. M. L. Formby, M.B., F.R.C.S. (56473).

Acting Col. T. E. Osmond (51563).

July 2.—Lt.-Col. (temp. Brig.) W. E. Tyndall, *C.B.E.*, *M.C.*, M.B. (24193) to be Col., June 14, 1943, with seniority from May 29, 1940. (Substituted for the notfn. in "Gazette" (Supplement) dated June 15, 1943.)

Capt. (Qmr.) P. J. Martin, *M.B.E.* (66766), to be Bt. Major (Qmr.), July 1, 1943.

July 9.—Lt.-Col. (temp. Col.) H. Alcock, M.B. (8847), having attained the age limit for retirement is retained on

the Active List supern. to estab., July 7, 1943.

Regular Army Reserve of Officers.

General List.

July 9.—The undermentioned offrs., late R.A.M.C., having attained the age limit of liability to recall cease to belong to the Res. of Offrs. :—

Feb. 17, 1943.—Maj.-Gen. P. H. Henderson, *C.B.*, *D.S.O.*, M.B. (5769).

June 12, 1943.—Maj.-Gen. J. F. Martin, *C.B.*, *C.M.G.*, *C.B.E.*, M.B. (1550).

June 30, 1943.—Maj.-Gen. H. P. W. Barrow, *C.B.*, *C.M.G.*, *D.S.O.*, *O.B.E.* (26352).

June 24, 1941.—Col. J. St. A. Maughan, *D.S.O.* (5088).

Oct. 12, 1941.—Col. C. M. Drew, *D.S.O.* (10565).

Oct. 18, 1941.—Col. L. V. Thurston, *D.S.O.* (10558).

Oct. 25, 1941.—Col. A. C. Hammond Searle, *M.C.*, M.B. (22913).

Jan. 1, 1942.—Col. D. F. Mackenzie, *D.S.O.* (10442).

Feb. 7, 1942.—Col. N. E. Dunkerton, *D.S.O.* (10589).

June 3, 1942.—Col. J. C. L. Hingston (12098).

Sept. 3, 1942.—Col. T. C. C. Leslie, *O.B.E.* (11036).

Nov. 8, 1942.—Col. A. G. Wells, *D.S.O.* (6776).

April 28, 1943.—Col. H. Gall (10908).

July 9.—Major B. H. H. Neven-Spence (11799), R.A.M.C., having attained the age limit of liability to recall ceases to belong to the Res. of Offrs., June 12, 1943.

July 13.—Lt.-Gen. Sir H. B. Fawcus, *K.C.B.*, *C.M.G.*, *D.S.O.*, *D.C.L.*, M.B. (13345), late R.A.M.C., having attained the age limit of liability to recall ceases to belong to the Res. of Offrs., May 20, 1943.

Maj.-Gen. R. B. Ainsworth, *C.B.*, *D.S.O.*, *O.B.E.* (9976), late R.A.M.C., having attained the age limit of liability to recall ceases to belong to the Res. of Offrs., Sept. 26, 1942.

Royal Army Medical Corps.

Capt. J. A. G. Burton, *M.C.* (51525), R.A.M.C., having attained the age limit of liability to recall ceases to belong to the Res. of Offrs., Jan 7, 1943.

THE ARMY DENTAL CORPS.

June 29.—Major (temp. Lt.-Col.) M. J. O'Reilly (15730) to be Lt.-Col. May 1, 1943.

Lt.-Col. S. A. Rodda (27139) having attained the age for retirement retires on ret. pay, May 1, 1943.

PRISONERS OF WAR.

Col. K. P. Mackenzie, Burma.
A/Lt.-Col. C. W. Maisey, Netherland East Indies.
T/Major H. M. S. C. Beadnell, Netherland East Indies.

Capt. D. F. Rees, Netherland East Indies.
Capt. H. A. Deverall, Malaya.
Capt. P. MacArthur, Malaya.

DEATHS.

KARSTAEDT.—Killed in action, April 11, 1943, in Burma, Captain Abraham Oscar Karstaedt, R.A.M.C., M.B. Born Feb. 26, 1912, he graduated M.B., Liverpool 1934, and took a War Emergency Commission as Lieutenant, November 13, 1939, being promoted Captain a year later.

READ.—In Bath, on June 1, 1943, Lieutenant-Colonel Harold William Kingcombe Read, R.A.M.C., retired. Born in Revelstoke, Devon, Feb. 11, 1866, he took the L.R.C.P., L.R.C.S. Edinburgh and the L.R.F.P.S. Glasgow, in 1888, and was commissioned Surgeon Lieutenant, July 27, 1892. Promoted Surgeon Captain, July 27, 1895, Major, R.A.M.C., July 27, 1904, and Lieutenant-Colonel, March 1, 1915, he retired Aug. 31, 1920. On the North West Frontier of India in 1897 and 1898, he took part in the operations on the Samana and at the Ublan Pass; also with the Tirah Expeditionary Force, being awarded the Medal with three Clasps. In South Africa in 1901 and 1902 he took part in the operations in Cape Colony, being awarded the Queen's Medal with two Clasps.

MELVILLE.—In St. Albans, on June 8, 1943, Colonel Charles Henderson Melville, C.M.G., late R.A.M.C., retired. Second son of the late Swinton S. Melville, sometime of the Hon. East India Company's Bengal

Civil Service, he was born in Mussoorie, May 20, 1863. Educated at Uppingham and Edinburgh University, he took the M.B. in 1885 and the D.P.H. of the R.C.P.S., England, in 1901. Commissioned Surgeon, Jan. 30, 1886, he was promoted Surgeon Major, Jan. 30, 1898, Lieutenant-Colonel, R.A.M.C., Jan. 30, 1906, Brevet Colonel, Feb. 24, 1912, Colonel, March 1, 1915, and retired Aug. 10, 1919. He was appointed Member of the Army Medical Advisory Board in 1906 and was Professor of Military Hygiene at the R.A.M. College from 1908 till 1912. He held the Retired Pay appointment at Reading from 1920 till 1927. He wrote "Military Hygiene and Sanitation," 1912; "Handbook of Hygiene" (Davies and Melville), 1913; Section on History and Epidemiology of Syphilis in Power and Murphy's "System of Syphilis"; "The Life of General the Right Hon. Sir Redvers Buller, V.C.," 1923. He took part in the Hazara (Black Mountain) Expedition, 1888, being mentioned in the Report of the Expedition for gallant conduct and awarded the Medal with Clasp. In 1915 and 1916 he served in Egypt and with the Egyptian Expeditionary Force; mentioned in despatches and thrice brought to notice he was created C.M.G. and awarded the British War and Victory Medals.

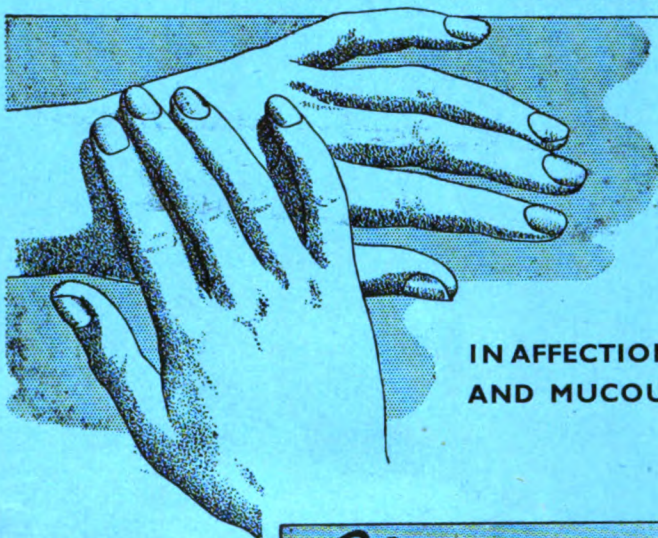


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Original Communications.

THE OFFICIAL MEDICAL HISTORY OF THE WAR.¹

BY SIR ARTHUR SALUSBURY MACNALT, K.C.B., M.D., F.R.C.P.,
F.R.C.S.

INTRODUCTION.

MEDICAL histories of wars meet more than one necessity. Primarily they are of value to the medical profession and medical administrators because they record discoveries and progress in medicine and surgery made under the stimulus of warfare, relate how problems of medical administration in theatres of war were met and solved and detail mistakes and errors for the profit of those who come after. Apart from their technical features these histories should be of interest to the statesman, the lay administrator, the general historian, the student of economics and the general reader. For they show that war is not restricted to strategy and tactics, that epidemic disease and the measures taken to combat it may also mean victory or defeat, while efficient hospital treatment may reduce the wastage of manpower from wounds or disease.

PREVIOUS OFFICIAL MEDICAL HISTORIES.

The value of medical history is accentuated if it is official for it then possesses many sources of information which are inaccessible to the unofficial medical historian.

The first official medical history of war was British. This concerned the Crimean War, was produced through the initiative of Sir Andrew Smith, Director-General of the British Army Medical Department, and was published in two volumes in 1858 [1]. The first volume deals with the medico-

¹ A paper read before the Section of the History of Medicine, Royal Society of Medicine, on Wednesday, March 3, 1943.

military matters of individual corps; the second volume (two parts) treats of the history of diseases and those of wounds and injuries.

There was a medical and surgical history relating to the French Army in the Crimean War (one volume), published in 1865 [2], and a short account of the Russian Medical and Surgical experiences, published in Berlin in 1871 [3]. The Medical History of the American Civil War 1861-65 was prepared under the direction of Joseph K. Barnes, Surgeon-General, U.S.A. [4]. Although only in two volumes, one Medical and the other Surgical, it took eighteen years to complete (1870-1888). This history sets a high and worthy standard and was eulogized by Virchow [5]. From 1884 to 1891 the Medical Section of the German Ministry of War published an elaborate official medical and surgical history of the Franco-German War of 1870-71 [6]. P. Myrdacz published an unofficial account of the Russo-Turkish War of 1877-78 [7]. The Bureau of Medical Affairs of Japan prepared a *Surgical and Medical History of the Naval War between Japan and Russia during 1904-05*, which was published in Tokyo in 1911 in an English translation of the original Japanese text [8]. The General Staff of the British War Office in 1908 published a volume of reports, principally by Lieutenant-Colonel W. G. Macpherson, R.A.M.C., which have a special bearing upon the medical services and sanitary conditions in Manchuria during the Russo-Japanese War [9]. A similar report was prepared by Major Charles Lynch for the War Department at Washington [10]. Of the many nations involved in the Great War of 1914-18, Great Britain and the United States alone prepared and published comprehensive medical histories, which included administrative and technical accounts. The Germans issued a medical and surgical history in nine volumes [11] but gave no connected account of their administrative arrangements. The French Government published a report of surgical statistics in two volumes [12] and nothing further officially. An account of the French medical service in the war was published in 1926 and 1927 by Médecin Inspecteur General A. Mignon [13]. An additional volume contained articles by various authors on diseases with some illustrations and biographies [14].

In October, 1914, Sir Walter Fletcher had arranged with Sir Alfred Keogh, then Director-General of the Army Medical Services, a system whereby the Army records might be standardized for statistical and other purposes by the Statistical Department of the Medical Research Committee. It provided the skeleton for the Official Medical History and thus early in the war Sir Walter Fletcher and Sir William Osler secured that preparations should be made for this history by special inquiries and the collection of relevant data. Colonel Adami, Registrar of the Canadian Army Medical Corps, closely collaborated. The Medical Research Committee also had the authority of the Army Council in respect of all the hospital records. In January, 1915, a Medical History Committee was set up with Keogh in the Chair. In order to arrange for the actual writing of the history, a new Committee was formed by Sir John Goodwin, Director-General, Army

Medical Services in December, 1918, with Major-General Sir W. G. Macpherson as Editor-in-Chief and Chairman.¹ Ultimately during the period 1921-31, this history was published in twelve volumes [15]. It is mainly a history of the Royal Army Medical Corps in the last war. Its lessons and experience have proved of great value to the Medical Department in connexion with administrative and other action in the present war.

In addition the Veterinary Services published a one volume history in 1925 [16]: the Australian Government issued the *Australian Army Medical Services in the War of 1914-1918* (two volumes) [17]; the Canadian Government included in its *Official History of the Canadian Forces in the Great War, 1914-1919*, one volume on the *Medical Services* [18]; and New Zealand a one volume history, *The New Zealand Medical Service in the Great War, 1914-1918* [19].

The United States Official Medical History was prepared under the direction of Major-General M. W. Ireland, Surgeon-General of the Army, and was published in 15 volumes during the years 1921-1929 [20]. It is a most valuable history. Colonel Frank W. Weed's work as Editor-in-Chief deserves mention as well as his unpublished Memorandum on his experiences during the preparation of the History and his recommendations in regard to any future Medical History [21].

SPECIAL FEATURES OF THE PRESENT WAR IN RELATION TO MEDICAL HISTORY.

The account here given shows that previous official medical histories have dealt mainly and sometimes entirely with the organization and advances in medical knowledge in an historical setting in relation to armies in the field. In other words they have quite properly been military medical histories.

The present war is unprecedented in that it affects the civil population much more than wars have done in the past in Great Britain. It is also remarkable in that a large standing army has been maintained in this country for a considerable length of time so that Service medical problems and those of the civilian population are closely intermingled. The war has also produced a number of new features in medical, public health and social history, for example, movements of population from urban to rural areas through official or unofficial evacuation, an entirely new Emergency Medical Service with, for the first time, administrative association of municipal and voluntary hospitals which receive both civilian and Service cases; it has experienced the effects of intensive air-raids; these have presented problems

¹ The constitution of the Committee was as follows: *Editor-in-Chief and Chairman*: Major-General Sir W. G. Macpherson. *Medicine*: Sir William Osler (later succeeded by Lieutenant-Colonel Andrew Balfour), Major-General Sir Wilmot Herringham, Colonel T. R. Elliott. *Surgery*: Major-General Sir Anthony Bowlby, Major-General Sir Cuthbert Wallace, Colonel Sir T. Crisp English. *Hygiene*: Colonel Sir W. H. Horrocks, Colonel W. W. O. Beveridge. *Pathology*: Major-General Sir William Leishman, Colonel S. Lyle Cummins. *Statistics*: Dr. J. R. Brownlee, Major W. R. Galwey. *General Scientific and Historical Subjects*: Sir Walter Fletcher and Lieutenant-Colonel F. S. Brereton.

in medicine and surgery which, if not entirely new, have never before been seen on so extensive a scale, and there have been many medical problems in connexion with industry, munition factories, nutrition and so forth.

It is obviously desirable that these great and unprecedented events should receive permanent recording in official medical history in order to assist the growth of knowledge and to inform future generations.

It is important to prepare material and to record events while they are fresh in the memory or they will be forgotten if left entirely to the retrospective historian. Much was done before hostilities broke out and much has already been done during the war. This early part can be assembled and put on record while the workers are still with us and the facts are fresh in their memories, though not necessarily in the final form in which these narratives will appear in the published history. Further, the writing of such a history entails inquiries and investigations which can only be pursued while the war organization is in being.

ORGANIZATION OF THE MEDICAL HISTORY.

There is a War Cabinet Committee for the Control of Official Histories of which the President of the Board of Education is Chairman and it was soon determined that an official medical history should be part of the organized plan set up by this Committee. The War Cabinet, with the considerations in mind which have already been detailed here, laid it down that this history, like the general official history, must be on a co-ordinated basis, including not only the medical side of the three Fighting Services, Navy, Army and Air Force, but also the medical civilian services.

On March 10, 1941, an interdepartmental conference recommended that an Editorial Board, composed of representatives of the medical departments of the Fighting Services and of other Government Departments concerned, should be appointed to direct the work and that Sir Arthur S. MacNalty, formerly Chief Medical Officer of the Ministry of Health and Board of Education, should be the Editor-in-Chief.

The President of the Board of Education, the Right Hon. R. A. Butler, M.P., became the first Chairman of the Editorial Board and guided its initial deliberations. He was succeeded by Mr. C. T. Flower, C.B., V.P.S.A., Deputy Keeper of the Public Records, in February, 1942. In addition to his high distinction as an historian, Mr. Flower is a member of the Advisory Historical Committee on Official Histories so that he keeps the Medical History in close association with all the histories of the war.

The Editorial Board has in its membership the Directors-General of the Medical Services of the Navy, Army, Air Force, the Director-General of the Emergency Medical Service of the Ministry of Health, the Deputy Chief Medical Officer of the Ministry of Health, the Chief Medical Officer of the Department of Health for Scotland, Professor J. M. Mackintosh, Glasgow University, the Secretary of the Medical Research Council and Dr. Janet Vaughan, Brigadier-General Sir James E. Edmonds, Secretary.

the Historical Section of the Offices of the War Cabinet, Colonel J. S. Yule,¹ Offices of the War Cabinet, Major-General L. T. Poole, War Office, and the Editor-in-Chief. Mr. W. F. Mellor is Secretary of the Board.

The Directors-General concerned appointed medical representatives to collect material for the History; these gentlemen, with the approval of the Editorial Board, were subsequently designated as Service Sub-Editors of the History. The Directors-General may be regarded as Editors of the Official Medical History for their respective Services.

The Editorial Board meets about twice a year. At their first meeting they appointed an Editorial Sub-Committee constituted as follows:—

The Editor-in-Chief (Chairman).

Surgeon Commander J. J. Keevil (Admiralty).

Colonel S. Lyle Cummins (War Office).

Wing Commander R. Oddie (Air Ministry).

Dr. J. Alison Glover (Board of Education).

Dr. A. Sandison (Ministry of Pensions).

Professor J. M. Mackintosh (Department of Health for Scotland).

Dr. F. H. K. Green (Medical Research Council).

Mr. W. F. Mellor (Secretary).

Subsequently Colonel S. Lyle Cummins resigned and was succeeded by Brigadier F. A. E. Crew, F.R.S., and Major R. N. Hunter. Dr. Charles Newman and Lieutenant-Colonel C. L. Dunn of the Ministry of Health, who are Assistant Editors at headquarters, subsequently joined the Committee.

THE WORK OF THE EDITORIAL SUB-COMMITTEE.

The duties of the Editorial Committee are many and various. It supervises the collection of material for the History, keeps the various Government Departments in touch with one another, prevents overlapping and unnecessary waste of effort in the collection of material, advises on detailed planning and the scope of the History and on the selection of contributors. It has power to co-opt experts from time to time on special subjects, consults with special investigation committees set up by other bodies, especially those of the Medical Research Council, and initiates inquiries and research through and in collaboration with these bodies.

The first main task of the Committee is the collection of material. With this end in view, Government Departments are giving their active collaboration by furnishing reports, circulars, memoranda and other official documents relating to medical administration as well as to technical and clinical subjects. Among the Government Departments collaborating are the Board of Education, Ministry of Labour and National Service, Ministry of Supply, Ministry of War Transport, the Department of Health for Scotland, Ministry of Pensions, Ministry of Food, Ministry of Home Security and the Mines Department. Close touch is also being maintained with the

¹ Resigned in 1943.

many bodies and persons whose work has any bearing, directly or indirectly, on matters of interest for the Medical History. Among these may be mentioned the Medical Research Council, the British Medical Association, the Central War Emergency Committee, the General Medical Council, the Nuffield Provincial Hospitals Trust, Royal College of Physicians, Royal College of Surgeons, Royal College of Obstetricians and Gynæcologists, the Anglo-Soviet Medical Council, etc.

In addition, the Dominion Governments are co-operating by furnishing data concerning their Forces stationed in this country and the Colonial Office will supply information relating to the Colonial Forces. The Allied Governments in the United Kingdom have also agreed to collaborate as regards the work of their Medical Services and the campaigns in which their Forces take part. For these arrangements I am much indebted to the Foreign Office and to the Chief Medical Officers of the Allied Governments. Close liaison has, too, been established with the Sub-Committee on Historical Records of the National Research Council of the U.S.A. which is collecting similar data for the United States Medical History of the War [22] and there is a mutual exchange of experience and information. Here I would express my gratitude to my old friend Professor John Fulton, Surgeon-General Parran and Dr. K. B. Turner of the American Embassy. Finally, the host of semi-official and voluntary agencies whose work brings them within the orbit of medicine and social medicine are being invited to contribute accounts of their work. The Medical History of the War casts its net widely.

THE WORK AT HEADQUARTERS.

The Editorial Sub-Committee meets at frequent intervals but it will readily be appreciated that much of the work is done through personal visits, interviews and outside inspections and conferences and the Sub-Committee when it meets has to consider the results of this spade-work.

For the past two years the Editor-in-Chief, his medical colleagues and the Secretary have been busily employed in building up a department of Medical History with a far-reaching organization concerned wholly with matters relating to progress during the war.

The History occupies its own offices at 25, Victoria Street, London, S.W.1. Here conferences and interviews are held and all those writing on medical problems of the war are welcome. In this office a centre of documentation dealing with the whole field of war-time medical work is being assembled. All the material on war-time medical problems will not necessarily be housed in this department. Much will be spread throughout the various Government Departments and elsewhere but the liaison now effected with the various Services and bodies assures that the material is being collected and will be available for the Official Medical History.

Close attention is being paid to medical literature. Much has already been written on medical problems during the war. Articles and papers of interest

are being collated and indexed. Advantage is being taken of the very complete organization set up by the Medical Research Council whose publication *Bulletin of War Medicine* provides an invaluable synopsis of war-time medical literature. The first editor, Sir Harold Scott, enlisted authorities in every branch of medicine, surgery and kindred subjects as abstractors for this *Bulletin* and has helped us in countless ways. *War Medicine* issued by the American Medical Association and the *Bulletin of Hygiene* published by the Bureau of Hygiene and Tropical Diseases are also providing valuable data. All available medical publications (English and foreign and those of friend and foe), are being scanned for material. Without this detailed scrutiny the History will not achieve its full purpose.

THE SCOPE OF THE OFFICIAL MEDICAL HISTORY.

The Civilian Aspect.—The Medical History will describe the state of the national health at the beginning of the war and the expansion of the Health and Medical Services to meet war conditions and their functioning and development during the war. Material for this section will be contributed by the civil Ministries working in collaboration, each one describing its growth and the changes in organization and administration. Some problems, such as evacuation, are being dealt with by several Ministries and here co-ordination will be necessary to give a balanced account and to avoid overlapping. Subjects to be dealt with will include the Emergency Medical Services, their organization and work during the war and the functioning of the medical and medico-social services throughout the country. Special attention will have to be given to such problems as those arising out of the planning and working of the evacuation schemes, the Civil Defence Services, shelter life; to problems of war-time nutrition and to all those medical and medico-social changes and developments which war has forced upon us for good or ill. I should like here to acknowledge the great help we are receiving from Medical Officers of Health and their staffs in these subjects. The war-time movements of disease, changes in type, and the adjustment in public health and medical technique to deal with them require to be described. The migrations of the civil population to meet war-time production requirements and their consequences and lessons in the field of industrial medicine also need description. These are some of the problems to be dealt with. Sub-Editors and narrators in the various Departments will assemble the material now being accumulated on these subjects with a view to the preparation of a connected narrative.

The Fighting Services.—The Fighting Services will contribute their own sections to the History. They will give an account of the organization of the Services before the outbreak of hostilities and of their growth and functioning during the war. They will describe the medical aspects of the campaigns; those problems relating to combined operations or those common to two or all the Services in various fields of medicine being dealt with by all three Services in collaboration. Medical problems peculiar to

the Services will be treated at length in these sections which are likely to be published somewhat in advance of other sections of the Medical History in order to avoid delay in bringing out the lessons of the war and, in particular, to put war-time experience quickly at the disposal of new entrants to the Services.

A great deal of material is being collected and classified in the Service Departments. Each Service is drawing up a synopsis of contents of its contribution and experts in naval, military and aviation medicine are being asked to contribute. Arrangements are being made for experts working on subjects wholly or partly common to all the Services to consult together in order to avoid overlapping. Contributors are being asked to submit progress reports, as of course final monographs cannot be written until the war is over and all its medical experiences gathered in. Progress reports or interim monographs will ensure that changing experience will be recorded while memory is fresh and at the same time furnish a record of the evolution of ideas and of changing problems and technique. Sub-Editors and narrators in the Service Departments will, as in the case of the non-Service Departments, put this material into preliminary form for inclusion in the History.

Technical Subjects.—The technical volumes will cover a wide field of subjects and include war physiology, nutrition, recruits and physical training, special problems of fighting men and those relating to shipwreck, immersion and exposure, etc.; war surgery—the effects of high explosive bombs, resuscitation, including blood plasma and serum transfusion. Space in the History will be allotted to war wounds and injuries—excision and débridement, wound chemotherapy, burns, blast and crush injuries, regional injuries, plastic surgery, closed plaster treatment, etc.; war medicine will include public health and hygiene, epidemiology, tuberculosis, venereal diseases, neuropsychiatry, industrial health, medical research, pathology, etc. Other subjects, such as war-time medical education, the social aspects of the war in relation to disease, the rehabilitation of the sick and wounded, etc., will also find their appropriate places. There will be statistics in the text of the contributions and probably a special volume will be devoted to this important subject.

CONCLUSION.

The aim of the Editorial Board is to secure the collaboration of all those working in various fields and to give in a readily accessible form an authoritative record of the advances in medicine made during the war for the benefit of statesmen, administrators, scientific workers, the medical profession and the public.

To assemble all this material and to prepare it for inclusion in the History involves, as we have seen, a great deal of organization and a wide basis of collaboration. The Board's task is to secure these *desiderata* and to ensure that the History shall be a real compendium of knowledge as to what the war has bequeathed to us in progress and technique in all the

realms of medical and public health endeavour. Such a work will, it is certain, be especially welcomed by the medical profession, upon whose whole-hearted co-operation the success of the Medical History will largely depend.

The Editor-in-Chief's duties are heavy and responsible ones, but they are lightened by the ungrudging help and support he has received from numerous colleagues both professional and lay.

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THE DEATH-INSTINCT IN MORBID ANXIETY.

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(1) FREUD arrived at his concept of the death-instinct by uniting two separate trains of reasoning: one dealing with the deathward current or impulse revealed in the principles regulating unconscious processes, the other with the formidable aggressive energies of the super-ego. He was always a dualist. Early convinced of the vast importance of the sexual instinct, and equally convinced of the importance of conflict in mental life, he may be represented as searching throughout his career for some instinctive force, equal to the sexual, which could be matched against it. In his earlier papers he regarded the conflict as a simple opposition between conscious ego-instincts and unconscious sexual instincts. Later, in his essay "On Narcissism" (1914), he produced evidence from the study of insane exalted states, of hypochondriasis, of patients with long or severe illnesses behind them, of the aged and of homosexuals, for the existence of a libidinal investment of the ego—for the existence of self-love, in other words, varying inversely in the same person with the amount of object love displayed. The idea of simple conflict between ego-instincts and sexual-instincts had to be abandoned, since the ego itself was sexually charged. His persisting belief in a dualistic interpretation of the mind had to be content with the contrast between allo-erotic and narcissistic libido—not a very satisfactory solution.

He next turned to the resistances offered to the exploration and expression of repressed sexual impulses for here an anti-sexual force was constantly in action. He found that the strongest resistances were unconscious, that is that part of the ego was unconscious; further, that the ego-ideal, the source of the moral and æsthetic restraints imposed on sexuality, was also prolonged into the unconscious as the super-ego, which aids and criticizes the unconscious ego in its repressing work. In the super-ego he found a relentless severity and harshness which could only in part be derived from the internalization of the idea of stern parents. It far exceeds in sternness the normal parental attitude and must be derived from some force innately present in the child's mind. This savage aggressive force directed (via the unconscious ego) against the merest stirring of sexual desire, constitutes a force of aggression which can fairly be set over against the sexual instinct. The dualistic theory of the mind was thus set on a firmer foundation.

In "Beyond the Pleasure Principle" he had already arrived, through examination of battle-dreams, of children's play, and the reactions of patients undergoing analysis, at the idea of a repetition-compulsion prin-

ciple, more primitive than the pleasure-pain principle, which plays an important part in the regulation of unconscious processes. Both are essentially conservative. One hastens to restore a former (lower) level of mental tension, the other tends blindly to repeat former experiences. Both look backwards. Both regulate the mind in such a way that it tends towards re-enactment of a former state of affairs. Both (as it were) sound the retreat over the field of mental activity. From the existence of these two principles Freud was led to describe an innate recessional tendency not merely towards a formal state of things but towards a first state of things; the stage of non-living, the state of death. Life contains a powerful deathward component. The constant aim of life is peace; not only the relative peace of unruffled emotion but the absolute peace of death. Here is something in sharp contrast with the sex-instinct, for this essentially revivifies, pushes life forward, accomplishes a new lease of life. Here is another dualism, that of the sex-instinct and the death-instinct.

Turning to his analysis of the super-ego with its exposition of a strong instinct of aggression, vehemently and continually opposed to the exhibition of the sexual-instinct, Freud concluded that this was identical with the death-instinct. The imminent deathward impulse of the organism revealed by the fundamental regulating principles of the mind has for its conative element the aggressive energies of the organism. Not all accept this view of aggression. Some deny the existence of an instinct of aggression, holding that aggression is a property of all instincts rather than an individual instinct. Many see it in an innate and invariable reaction in thwarting arising when any instinct is prohibited or prevented from expression—corresponding to McDougall's instinct of pugnacity. Yet those two facts remain. Operating through the super-ego aggression is the strongest anti-sexual force of the mind: and the death-instinct itself is the one instinct whose aim is furthest removed from that of the sex-instinct.

(2) This paper is based on the Freudian concept of the death-instinct, shown in brief outline above. It is here applied to cases of morbid anxiety developing out of battle-stress. Consideration of the symptoms of a number of cases has led to the belief that the death-instinct plays an important part in their production. Some evidence for this belief is offered in the following notes. The acute reaction is considered in detail and related to the unconscious pressure of an impulse towards self-destruction. Battle dreams and other similar events are placed in the same context of instinctive display. The frequent occurrence of aggression is noted. Finally, an attempt is made to explain the state of persisting chronic anxiety from the angle of the death-instinct rather than from the angle of the sexual-instinct.

The Freudian description of anxiety as a pure neurosis without endopsychic conflict, the result and expression of unsatisfied libido, is well known. Those who react to bombardment with a display of anxiety are fitted into the Freudian dictum by postulating in them a homosexual

organization of the libido and a massive libidinal investment of the ego. Thus the libido stirs when the ego is threatened. Narcissism is undoubtedly a feature in many cases. The anxious, self-centred, narcissistic soldier is a familiar inhabitant of the psychiatric ward. Yet there are many more in whom it is difficult to postulate such an organization. And in some, at any rate, of these there seems to be better grounds for assuming as a cause the concealed but dynamic presence of the death-instinct.

(3) *The Battle-dream*.—The battle-dream illustrates the repetition-compulsive principle, that principle which by impelling the mind to repeat its former experiences reveals the working of the death-instinct. The battle-dream illuminates the deathward drive of the organism. Dreamers of frequent battle-dreams display an energetic repetitive impulse and, by inference, an active or unharnessed death-instinct. They are found *par excellence* among the victims of morbid battle anxiety.

It is unnecessary to give examples of the classic dream which is familiar, repetitive and disturbing. The event of the greatest importance is the one most usually selected for presentation in the manifest content. Attention may be drawn to other recurrent mental events in anxious patients, similar to battle-dreams and deriving from the same impulse. Home dreams, moving and vivid, are exceptionally common, the dream history often presenting an alternation between the themes of war and of home. Some patients, in a variant of the home-dream, display a fusion of the two forms.

Corporal H., R.A.M.C., aged 32, served in the Greece and Crete campaigns. During the retreat across Crete, he watched, from the shelter of a dried bed of a stream, the destruction of a Cretan village from the air. In a recurring dream he finds himself watching, with the same helplessness, the destruction of his own house by bombs. His wife and daughter are trapped inside.

Another patient with a severe anxiety neurosis, precipitated by his experiences in Crete, reported the following recurring variant of the battle dream, in which his own death wishes were thinly masked.

Sapper T., Docks Operating Coy., R.E., aged 25, when in Crete was on the beach at Suda Bay while three of his closest friends in the company were helping to unload an ammunition ship in the Bay. He watched seven bombs strike the ship, which blazed up immediately and sank very quickly. He saw men jumping off the burning ship: they were picked up by a caique standing by. His company lost fourteen men on this ship, three of whom were his friends. In a recurring dream, he dreams the whole episode as though he himself were on the ammunition ship. He hears the crash of bombs, sees the flames start up round him, tries to find his way to the ship's side, feels himself doomed.

Here is another example where the impulse towards a former state of things brings together two themes in the same dream.

Gunner F., R.H.A., aged 25, had an anxiety neurosis of gradual onset which developed during the months following Italy's entry into the war when he was serving in the Western Desert. A state of severe anxiety was eventually touched off in December, 1940, by the bombing of his battery.

His unit was mechanized in India. In a recurring dream he relives his bombing experience with this variation: the battery is horse drawn. He sees horses mutilated and killed. He himself is riding a horse which is trying to bolt. He wakes in extreme fear, his arms rigid and gripping the bed-clothes as though he were pulling on the reins.

He was most attached to horses and felt it deeply when his unit was mechanized. He was never as happy in his work after the change over. His dream took him back not only to the scene of battle but also—though in a terrifying way—to the old state of things before mechanization.

Finally, the case of Private R., R.A.O.C., aged 23, may be quoted. He was a moderately severe example of battle anxiety. He reported frequent recapitulatory battle dreams and also dreams in which he reconstructed the scene and circumstances of his father's death.

In addition to dreams, recurrent hypnagogic hallucinatory states, present in a setting of morbid anxiety, were not uncommon. These again in their (distorted) reminders of battle experience revealed a powerful compulsion towards repetition of past experiences and therefore a strong deathward drive.

Private F., 2nd Camerons, aged 26, developed an acute anxiety state before Sidi Barrani in the first Libyan offensive (December, 1940). He had frequent battle dreams and also vivid hallucinations just before sleep in which he was surrounded by Italians who took him prisoner or stabbed at him with bayonets.

This patient, who was intellectually defective, was frightened by a pig when he was 6. For some years afterwards he had frequent pre-dormital phantasies or hallucinations of pigs' faces.

Other hallucinations are not directly attributable to battle experience but by their repetition indicate the activity of the same compulsive principle.

A.B.J., R.N., aged 20, had a condition of morbid anxiety, with vague apprehensions and frequency of micturition, set up in a mild form after exposure to bombing in England and re-activated by the news that three or four of the seamen who were drafted East with him have since been drowned. He had repeated pre-dormital hallucinatory states in which his hut or tent expanded to a great size and a large human face appeared above his head. The hallucinosis dispersed gradually when he "shook himself" and lit a cigarette.

Corporal R., A.T. Coy., R.E., aged 22, presented symptoms of battle-anxiety which developed gradually during the siege of Tobruk after an initial period of indifference to danger. In hospital he complained of repeated "waking nightmares" just before sleep, in which he was in the middle of "lots of people running round and round and getting nowhere." These were associated with increasing fear and excitement. At the climax he could only just restrain himself from screaming.

A.C.1 D., R.A.F., aged 25, had a condition of mild anxiety following exposure to raids in the Canal Zone. He was hospitalized because of nightly hallucinations of size. In these he had the feeling that his surroundings—hut or ward—fell away and were replaced by an enormous room with a sloping roof. He occupied a bed in one corner of this room. He, too, was of great size. His arms and hands were so big and heavy that he could not move his arms or pluck at the blankets. A good deal of anxiety was generated by these experiences. In his sleep he had frequent bombardment dreams.

(4) *Aggression*.—The innate tendency towards aggression is the source of the conative thrust of the death-instinct. Aggression, internally or externally directed, is the death-instinct in action. External aggression appeared prominently in a number of cases of battle-anxiety. Anxious patients were more difficult, more hostile, more truculent than other neurotic casualties: more aggressive, too, than an equivalent sample of normal persons—suggesting in these patients the more active presence of a deathward impulse.

Gunner C., R.A., aged 25, was admitted with a severe anxiety neurosis following exposure to dive-bombing in the Western Desert in June, 1941. He developed an acute reaction whenever the hospital siren went—a frequent occurrence at that time. This was in some instances accompanied by aggressive impulses, not always restrained. On one occasion a patient woke to find Gunner C. gripping him by the throat. At other times C. found himself by a patient's bed prepared to choke or smother him but was able to check himself. He feebly rationalized his actions by saying he "wanted to save them from the bombs." At his own request he was moved into a single bedded side ward. His fear of injuring other patients was greater than his fear of being alone in air raids.

Here the stimulus of an anxiety reaction also evoked a display of aggression. In other cases the connexion was not so clear but there was often a general increase of pugnacity and irritability in the chronic state. Gunner C., quoted above, during his stay in hospital, was liable to outbursts of fury which were stirred up by quite trivial annoyances. On one occasion he threw his plate at an Arab boy selling chocolates in the ward for the not very adequate reason that the boy was a few minutes late.

Driver B., an example of anxiety with pre-dormital hallucinations, on two occasions, both after absenting himself without leave, was involved in fights with other patients. His attitude, too, was harsh, truculent and disrespectful.

Both recognized and stated that their pugnacity was a new development which occurred only after the onset of their anxiety symptoms, suggesting a sensitization or liberation of the aggressive energies of the death-instinct under the strains of battle.

Another example of a slightly different character is provided by Serjeant H.

Serjeant H., U.D.F., had a naturally irascible and aggressive temperament. He developed battle-anxiety after very slight exposure to bombardment. At home, he said, he had to give up politics because they led to argument and in argument he invariably flared up and became involved in a fight. His anxiety neurosis developed outside Alexandria, watching that city's anti-aircraft display; six men of his unit became casualties to shell splinters. It intensified outside Mersa Matruh which was as far forward as he got. He had to be evacuated from there.

Private K., R.A.M.C., aged 23, was one of two men in his unit admitted to hospital with anxiety symptoms after the bombardment of his hospital. The other man had had previous exposure to bombardment. Private K. was a bitter, aggressive Irishman who had a life-long history of pugnacity and truculent behaviour.

In these two instances a low anxiety-threshold was found in naturally aggressive patients.

(5) *Acute Reaction*.—The course of a typical anxiety case includes (1) The development of acute and abnormal response to conditions of real danger, (2) the development of chronic or persisting anxiety, present when there is no danger and established gradually or suddenly, (3)—superimposed on (2)—a tendency to uncontrolled reaction to slight external stimuli, the noise of a plane, air raid sirens, festival gunfire, demolition explosion, etc., often known by the sufferer not to threaten him.

The acute reaction is familiar though it is rarely seen farther back than the Field Ambulance or C.C.S. The first point to be made is that it is not the intense, unhampered expression of a single emotion. It is more than intense; it is disorderly, the outcome or expression of a conflict. The following features may be stressed: paralysis, useless movement, dangerous movement, stupor and the panic-reaction.

Gunner F. was one of a group of men standing close to a slit trench when an Italian bomber came over. The serviceable reaction, one which satisfied both the impulse to flight, or hiding, and the demands of duty, was to scramble into the trench and crouch there with head just below ground level. This his companions immediately did but Gunner F. found he could not move his legs. He dropped on his hands and knees and began to crawl. The crawling was aimless and uncertain and took him no nearer the relative safety of the trench. Eventually he ceased movement altogether and remained inert and helpless until well after the bomber had passed. Then he got up and returned to his truck, trembling violently.

His behaviour indicates the interlocking of the normal mechanism of flight, or hiding, with a countervailing impulse in exactly the opposite direction. The one tended to carry him into a position of greater safety, the other to pin him down in a position of greater danger. One sought to save him, the other to destroy him.

The maiming of the operation of flight is seen also in this example.

Private R., R.A.O.C., was sent on salvage to a railway siding north of Rouen in May, 1940. The railway line was bombed three times by German planes that morning. In the first raid orders were given to take shelter underneath the trucks. R. felt something squeezing his heart, which then started beating "terribly quickly." His legs were wobbly, something seemed to be holding him back and he couldn't get away quickly. He felt something pinning him down and he "had to make a big effort to overcome it." Although well placed to reach the shelter of the trucks he was one of the last to do so. Orders were given to scatter in subsequent raids into a field at the warning of the engine whistle. When the warning came he was "able to run slightly but not so hard as he should have done": something seemed to be gripping him and his legs wobbled. In the third raid he was able to run but only falteringly.

Aimless, unserviceable movement is common in the acute reaction.

Marine C., aged 21, was attached to an aerodrome in the Canal Zone for defence purposes. When the aerodrome was raided he ran out of his hut, made for a trench, got into it, got out again and ran round in circles. His actions were a mild form of panic reaction: he had no amnesia.

Incidentally before coming out to the Middle East he was exposed to bombardment in four heavy raids in England. In three of them he displayed an acute reaction. In the fourth, in London when he was on leave with his family, he was not at all affected.

More striking and more illustrative of an unconscious impulse towards self-destruction are those examples of the acute response where the person's movements actually lead him into greater danger.

Gunner M., R.A., aged 29, made a rapid recovery from an anxiety neurosis generated by bombardment. He was returned to his unit. In the first exposure to bombardment after his return fire-bombs were dropped. He experienced, first, a feeling of excitement, then a period of complete but momentary calm, then an overpowering impulse to bolt. Bolt he did, but towards the falling bombs.

Rifleman D., R.B., aged 22, had a serviceable reaction to bombardment during his first months in the desert. His unit was taken back to re-equip, and during that period he knocked down and killed an Egyptian while driving a W.D. vehicle. This precipitated a state of morbid anxiety. His "nerves were very bad" when he rejoined his unit. He expected retribution for his act of manslaughter. In the first raid he was "all over the place" and bolted straight into the track of the bombers which were bombing out a wadi running at right angles to the Bardia-Tobruk road. Eventually he walked into a booby field and was blown up three times.

Private W., U.D.F., aged 21, was stationed with his unit just outside the perimeter of Mersa Matruh. After the town had been raided twice he was evacuated. In both raids he broke away and tried to "run away." Actually he ran towards the path of the bombers circling above the town.

Gunner S., R.A., aged 22, developed an anxiety neurosis in Crete. In spite of this he was sent into the Western Desert. The first time an enemy plane came over he was standing by the cook-house. He immediately turned and ran, his (conscious) idea being to get as far away from the camp as possible. Although running "away" from the plane he ran along its path, like a hare caught in the beam of a car's headlights.

In the battle of Agordat the R.F. advanced and captured the enemy's forward positions. Corporal L., aged 25, was ordered over to the right with his section to cover the flank. They were heavily shelled and ordered to withdraw; all did so with the exception of Corporal L., who did not receive the order. He lay helpless for forty-five minutes. Then he got up and ran . . . *towards* the enemy guns. When he realized what he was doing he turned and made for our own lines which he reached in a state of acute anxiety with violent tremors, tachycardia, and speechlessness.

In such examples the evidence of an unconscious deathward urge, liberated by the presence of danger, is strong. In these cases where the acute reaction takes the form of unserviceable and aimless movement, such movement is to be regarded as a pattern of action, the resultant of movements tending on the one hand to save, on the other hand to annihilate. The paralyses of some reactions are to be regarded in the same light as conflicts of larval movements in opposing directions.

Stupor may descend in the acute reaction. It is usually labelled hysterical but is more properly to be looked on as an expression of hyper-acute anxiety. The patient—often after a bomb or shell falls near him—lapses into unconsciousness which may be prolonged. But the onset of

unconsciousness is not immediate and there is no retrograde amnesia. It is rather an abdication of consciousness. It has to be distinguished from concussion arising from blast injuries or a direct blow on the head: though these of course often induce an anxiety syndrome when consciousness is resumed.

Gunner M.'s experience is typical of such cases. The first phase of his anxiety symptoms developed suddenly with a stupor. He drew up one morning at his company echelon, hearing as he did so a warning against an approaching bomber. He dismounted, got clear of his truck and knelt down with his head bent forward and buried in his arms. He heard the whistle of a descending bomb, saw the flash and heard the crash of its explosion. He was lifted bodily through the air and deposited on the ground again 30 feet away. He observed that one of his company was badly wounded, saw the ambulance drive up, and then—and only then—became unconscious. He recovered consciousness twenty-four hours later.

Here the danger was so great, the prospect of death so vivid, that there was a tremendous enlargement and liberation of the death-impulse. As death swooped down on Gunner M. his death-instinct as it were rushed up to meet it. But the bomb missed and the danger was over. Nevertheless, his internal impulse towards death was so powerful that it produced in him a condition far beyond that of paralysis: a condition of mimic death.

Sapper H., R.E., aged 27, was engaged in the battle of Capuzzo (June, 1941). He was one of six men stranded on the escarpment near Sollum. German armoured cars advanced on them, firing. With the others he ran for the edge of the escarpment, falling three times in the hundred yards run. He scrambled over the edge of the escarpment down to a truck and there became unconscious for half an hour. The stretcher bearer "thought he was dead."

The impact of the death-impulse was felt in full force after Sapper H.'s relative security had been ensured. While maiming his endeavour to reach safety—it brought him down three times in the short journey to the edge of the escarpment—the impulse left the external agent to administer the *coup de grâce*. When, in spite of this, safety was achieved, the unwedded impulse fell like a hammer blow on Sapper H., reducing him to a state of deathlike stupor.

More common than stuporous states are periods of intense, panicky agitation, entered upon at times of extreme danger, for which the patient is afterwards amnesic. The sufferers jabber, scream, rush round wildly, hit out in an irrational fury or may exhibit epileptiform convulsions. One example will serve:—

Serjeant S., R.A., aged 30, was pitching camp in the Western Desert when a dive-bombing attack began on an aerodrome 300 yards away. He saw the first planes go into their dive and then "passed out." He remembers nothing of what ensued for some hours and states that he was unconscious. Actually he was admitted to the nearest M.R.S., jabbering incoherently with violent generalized tremors and nearly complete inattention. When he "came to" he felt limp, exhausted and helpless.

Note that this amnesia is more than the simple repression of painful memories. He states "I passed out"—not "I can't remember." Some-

thing definite happened of greater significance than the performance of a *post hoc* repressive act.

Such experiences are too dramatic and intense to be explained as the resultant of forces of movements exerted from the opposite poles of safety-seeking and death-wishing. Nor, like stupor, can they be interpreted as a mimicry of the death hoped for by external agency, produced by a powerful thrust of the death-instinct. Yet they are akin to this. Once again there is a tremendous liberation and enlargement of the self-destructive impulse in the presence of great danger. The impulse acts by thrusting the individual into a mental half-world which is neither death nor personal existence.

He is a depersonalized frantic atom rushing about in a corridor between life and death, like a propeller threshing out of water. There is dislocation both from the environment and from his own personality. Amnesia is to be regarded as the necessary sequel of this dislocation rather than as the walling off of a repressed and painful effect. Memory returns when the personality reforms and contact is established with his past history and present surroundings.

In the case of Serjeant S., a connexion between the stuporous and agitated states can be traced. In his first acute reaction, which occurred after some months' exposure, he was overcome by transitory stupor or unconsciousness twenty-four hours after dive-bombing. In the next he had a similar lapse of the same duration just after a dive-bombing attack. In the third a transitory stupor overcame him just as dive-bombing started. He quickly recovered but was helpless throughout the action by reason of tremors and paralysis. His fourth exposure was the one detailed above.

Chronic anxiety, as will be shown later, is to be regarded as a perpetual conflict between the death-instinct and the flight impulse with its congeries of symptoms grouped under the name of "fear." In this conflict a process of absorption occurs, the death-instinct taking up or erasing some of the symptoms of the syndrome of fear. Such a process is to be observed also in the acute response. In paralysis deletion is partial; the opposing forces neutralize each other and the result is inertia. A similar partial result takes place in the reaction of aimless movement where neutralization of the opposed forces results in a pattern of action which is neither entirely safe nor actively harmful. In the reaction of dangerous movement, however, deletion is complete. The resistance of fear is overcome and the surplus energy of the death-instinct is free to thrust the individual into greater danger. Gunner M. experienced "first, a feeling of intense excitement, then a period of momentary calm, then an overpowering impulse to bolt." In the brief interval of calm the process of deletion is complete. No fear is left. Then the unchecked surplus of the death-impulse acts and Gunner M. bolts towards the falling bombs. In stupor, too, the liberation of the death-impulse is so excessive that the resistance of fear is instantaneously overcome and absorbed and the overplus, when foiled by the failure of the external agent, is intense enough to fell the individual in a state of mimic death.

In the panic-reaction the effort of the death-instinct is not directed in the same way at the obliteration of fear; it is aimed at the production of mental death as opposed to the mimic death of stupor. This is achieved by nearly complete depersonalization. Depersonalization is accomplished by heaving overboard the whole mass of fear which just previously informed the personality. Instead of attacking fear, the death-instinct ejects it from the ego which, as a result, collapses. On the one hand there is death of the personality, on the other an efflorescence of impersonal fear, fear exploding *in vacuo*, without channels of action, restraint or control.

Paralysis and inutile movement express or contain conflict. Dangerous movement and stupor express the outcome of conflict—a temporary triumph for the death-impulse. In a slightly different sense the same statement is true of the panic reaction. The reactions of unreasoning aggression and of epileptiform convulsions, which are sometimes regarded as varieties of the panic reaction, are more closely related to the stuporous state. In both there is complete absorption of fear by the ascending surge of the death-impulse. The result is, in the one case, an uninhibited exhibition of the exteriorized aggressive energies of the death-instinct; in the other a mimic (epileptoid) death.

(6) *The Chronic State*.—Persisting morbid anxiety arising out of battle stress may develop suddenly, after a single shock, or gradually, step by step, with increasing severity of reaction to acute danger. “Gradually” is a relative term depending on the height of the anxiety threshold and the degree of exposure. An Australian developed a well-marked chronic anxiety from nothing in the four days in which he lay outside the Tobruk perimeter before our final assault.

Usually it is in this state that patients reach the Base Psychiatric Unit. It is characterized by persistent physical symptoms—headache, frontal or occipital, dull, throbbing or piercing, palpitations, tachycardia, enuresis, frequency, epigastric pain, continuous or related to food intake, vomiting, diarrhoea, sweating, etc.—of which the patient “selects” one or two, not more usually, for presentation in his illness. Mentally it is characterized by a vague sense of imprisonment, a vague sense of insecurity, a continuing premonition of non-existent calamity; along with a very definite worry about the persistence of the physical symptom or symptoms. In battle cases the latter is more in evidence than the former, which may be absent altogether, and is rarely as prominent as in the anxiety neurosis of civil life.

In terms of a persistent, active and unconscious death-impulse, this state of chronic anxiety is to be interpreted as the issue of conflict between two opposed and unconscious forces. The individual carries within him a continual threat to his own safety, a threat made more ominous by repeated exposure to external danger which has sensitized the destructive impulse. Opposed to this is the common instinctive reaction to danger

unconsciously evoked—the impulse towards flight with its (conscious) train of mental and physical changes. The result differs from the usual neurotic symptom, where there is a compromise between the repressing forces and the result is satisfactory to both ego and id. In this case there is simple deletion from the normal symptom-aggregate of fear so that one, or perhaps two, fear symptoms survive; deletion and perpetuation of the surviving symptoms. There is persistent expression of partial fear. In the acute reaction the swift and spasmodic attempts by the liberated death-instinct to engulf fear were noted. In the chronic state the absorbent action of the death-instinct is sustained and persistent but incomplete. There is an overlap of fear—one symptom or perhaps two—which is resistant and which provides the syndrome of chronic anxiety.

The vague apprehension is well understood if it is related to an impulse towards self-destruction lying beneath the surface of consciousness.

In this interpretation, chronic anxiety is held to be a psychoneurosis, mentally determined, and not a simple neurosis arising out of a physical (sexual) cause.

(7) *The Acute-on-Chronic Reaction.*—On the course of morbid anxiety persisting in the absence of external danger there is superimposed a number of acute reactions to slight external stimuli. These do not differ in kind, and often little in intensity, from the acute reaction to real danger. Air raid warnings sounding over a ward full of chronic anxiety cases were a prolific source of such reactions. The hospital in which they were warded lay in the course of enemy bombers flying down to Suez. The chances of being hit were extremely small; indeed, the air raid warning was little more than a formality. Yet in every alarm there was a mad rush to the slit trenches from this ward. Many patients went to bed fully dressed. Aimless movement, paralysis, tremors, were all seen. Some patients cowered in the trenches till dawn, refusing to accept the “No Parade” call, which signalized the “All Clear.” Gunner C.’s aggressive reaction has been noted. Stimuli other than the hospital siren were demolition explosions, rifle fire, festival gunfire, earthquake tremors and even the switching-off of lights. Any of these were capable of discharging an acute reaction in one or more of the victims of battle anxiety.

Gunner M., R.A., aged 23, was admitted to a General Hospital with severe dyspepsia whose psychogenic nature was not at first suspected. He was confined to bed for some weeks on a low diet. Normally he went to sleep before “lights out.” One night he was restless and could not sleep. When the lights were switched off he felt he had to leave ward. “It was a case of getting out or screaming.” He went out for ten minutes and then returned trembling. He was in bed for fifteen minutes, when he had another overpowering impulse to run. He remembers getting out of bed and grabbing his slippers—“he had no time to put them on.” Thereafter there was a blank until he found himself in the Sister’s Room. In the interval he had been rushing along the road encircling the hospital. It was in this state that he was discovered and brought back to his ward.

He had had much exposure to enemy action in Eritrea, Capuzzo and Halfaya and was undoubtedly a case of chronic battle anxiety.

In these acute responses of the chronic case we observe a sensitized death-impulse "touched off" by signals or stimuli suggesting real danger. The sensitization is a process that has usually taken weeks to develop, though it can be established after a single shock and is the result of repeated exposure to external danger. The pressure of a sensitized death-impulse produces a reactionary facilitation of the impulse of flight. There is, therefore, an intensification of the combat between fear and death which goes on continuously in the chronic state.

The issue of the combat may be indistinguishable from the more intense varieties of the acute reaction to real danger, where there is complete deletion or expulsion of fear. More often, perhaps, the outcome is one of neutralization of the death-impulse with paralysis, tremors or aimless movement.

The process of sensitization is observed in epitome in the following acute-on-chronic reaction.

Gunner M., quoted above as an example of the stuporous reaction to danger, endured, soon after his admission to a base hospital, the opening of Muharram. This was celebrated by firing a gun, stationed some miles from the hospital, at short, regular intervals throughout the afternoon. The significance of the report was understood by the patient. The first five or six were ignored. After the next two or three there were transitory tachycardia and excitement. Later "jumpiness" was shown. Finally he became tremulous, had a brief feeling of utter calm, and then became stuporous for two or three minutes, of which afterwards he remembered nothing.

There was here, despite all that reason told him, a whetting of the death-impulse at each report, together with the opposition of increasingly forceful fear-impulse. This culminated in an acute reaction of the deletive type.

The acute-on-chronic reaction, then, is largely dependent on the sensitization of a latent death-impulse. The sensitized impulse seizes on stimuli sometimes only remotely representative of real danger. One has the impression that there is almost a craving or avidity for opportunities to display an acute response.

Corporal H., R.B., aged 24, was returned to his unit in a state of chronic anxiety after a blast injury some months previously. On the morning after arrival he was sent to observe a battery of R.A. calibrating their guns. He stood on a ledge or promontory overlooking and just behind the battery. There was, of course, no possible, conceivable danger. Yet as soon as the first gun opened fire he developed an acute reaction of the paralytic type.

There is complete indifference to logic in such reactions. The motive power is unconscious. We are again dealing with the repetition-compulsion principle. The death-instinct displays a tendency to return, not indeed in these instances to the scene and circumstances of danger but to the reactions that danger evoked. It tends to repeat its own exploits.

(8) *Summary.*—The symptoms of a number of cases of battle-anxiety are related to the unconscious presence of the death-instinct. The repetition-compulsion principle, from which the idea of a death-instinct was originally derived, is revealed in battle-dreams, in home-dreams and in certain variants of these two forms; in hypnagogic states and in the acute reactions of the chronic case where there is no real danger. Aggression, the conative element of the death-instinct, is laid bare in the development of chronic anxiety. Moreover, persons who are naturally aggressive are found to have a low anxiety-threshold. The symptoms of chronic anxiety arise as a result of conflict at unconscious levels between the death-impulse and the flight-impulse. The conflict produces deletion from the total symptom-aggregate of fear with perpetuation of the surviving symptoms. In the acute reaction to external danger there is a conflict between the same two forces of far greater intensity. In the paralytic reaction and the reaction of aimless movement the opposing forces neutralize each other. In the reaction of dangerous movement deletion or absorption of fear is complete and there is more or less open exhibition of the death-impulse. This also occurs in the unreasoning and violent aggression sometimes observed. In the stuporous and epileptiform states, after instantaneous wiping out of fear, the destructive impulse produces mimic death. Mental death occurs in the panic-reaction. The mass of fear which previously informed and sustained the personality is thrust outside the ego by a violent effort of the death-instinct. The ego collapses and there is intense display of impersonal and uncanalized fear.

I beg to record my most grateful thanks to Brigadier G. W. B. James, M.C., Consultant in Psychological Medicine, M.E.F., and to Major R. B. Craigie, Officer Commanding No. 1 Psychiatric Centre, M.E.F., for their kindly criticism and advice during the preparation of this article.

THE INCIDENCE AND PREVENTION OF EYE INJURIES IN H.M. FORCES.

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THE purpose of this survey is to assess the incidence and effect of eye injuries in H.M. Forces and to determine conclusions which may help to prevent them. It is based on an analysis of 10,000 cases from all branches of the Services under static conditions of warfare.

All these cases were examined at a Military Ophthalmic Centre: subsequent in-patient treatment was continued in a General Hospital so that there was continuous supervision and facilities for observation. The Centre was fully equipped with all modern apparatus, such as a slit lamp, etc., and possessed its own optical department, staffed by Serjeant Opticians, where spectacles were assembled and dispensed. The Ophthalmic Department of the General Hospital had a full range of all modern surgical instruments of the highest quality together with two magnets and a diathermy set. During the period under investigation there was little enemy activity so that ophthalmic work continued with the minimum of interference and under conditions approximately those of civilian practice with differences which will be dealt with later.

The object of our work was to increase the efficiency of the Forces by optical assistance and to limit the loss of man power occasioned by eye disease and accident.

Increasing mechanization of the Army, with the need for workshops, has proved a frequent source of serious eye injuries; it seemed profitable to review these eye cases as a whole and to determine what proportion were preventable and by what means.

OUT-PATIENT ANALYSIS.

This analysis is compiled from cases attending the Military Ophthalmic Centre: it does not include errors of refraction or severe cases admitted to hospital.

Diseases of the Lids.

Blepharitis	186
Styes	23
Meibomian cysts	89
Abscess of Meibomian glands	38
Trichiasis	5

Diseases of the Conjunctiva.

Conjunctivitis	470
Burns (petrol, lime, acid)	6
Subconjunctival ecchymosis	2
Lacerations	2
Trachoma	4
Pterygium	1

Total 1,466

Diseases of the Cornea.

Ulcers	170
Foreign bodies	86
Abrasions	29

Diseases of the Iris.

Iritis	12
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Diseases of the Orbit.

Infection or inflammation of socket	48
Provision of artificial eyes	54

Diseases of Lacrimal Apparatus.

Investigations and minor operations	241
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Thus, of 10,000 cases, 1,466 required minor treatment of a type usually carried out in the casualty department of an Ophthalmic Hospital.

Conjunctivitis caused the largest number and many were due undoubtedly to the practice of bandaging a discharging eye, either by the patient or unit medical officer. Cases of obstructive lacrimation are also frequent and are of great importance in military practice since they impair accurate shooting, outdoor manœuvres and driving. Chronic blepharitis of the seborrhœic type was given the routine treatment by triple dye, shampoos, etc., but if relapses occurred the patient was discharged from the Forces. Superficial corneal foreign bodies were not unduly numerous, most being removed by the unit medical officer. Discharging sockets resulting from irritating artificial eyes account for much loss of man-hours, especially in low grade units. The provision of a comfortable artificial eye for a soldier is of great importance and is well recognized by the authorities. Of these minor treatment cases, 9 per cent were definitely due to trauma; probably preventable in most cases.

IN-PATIENT ANALYSIS.

This analysis is compiled from records of the Ophthalmic Wards in the General Hospital. Compared with civil practice the figure is high but it must be remembered that it is frequently not possible or economical to have soldiers attending an out-patient department daily, either because units are too far away or frequent transport is costly. A higher proportion of cases therefore is admitted to hospital.

<i>Diseases of the Lids.</i>					
Blepharitis	34	Abrasions	13		
Delayed plastic repair ...	4	Burns (cigarette)	2		
Trichiasis	2	Keratitis :			
Primary suture after		(a) Filamentary	1		
injury	3	(b) Fascicular	8		
Multiple Meibomian cysts	6	(c) Disciform	9		
Abscess of Meibomian		(d) Interstitial (specific)	4		
glands	5	(e) Secondary to skin			
		disease	4		
		(f) Superficial punctate	2		
<i>Diseases of the Conjunctiva.</i>					
Conjunctivitis	49	<i>Diseases of the Iris.</i>			
Conjunctivitis due to		Iritis :			
malingering	1	(a) Focal	11		
Burns	5	(b) Gonorrhœal	5		
Trachoma	1	Iridodialysis (cricket ball)	2		
Vernal catarrh	2				
Ulcer (trauma)	1	<i>Diseases of the Ciliary Body.</i>			
Pterygium	1	Cyclitis (without iritis) ...	2		
<i>Diseases of the Cornea.</i>					
Ulcer (all types)	52	<i>Diseases of the Lens.</i>			
Wounds (non penetrating)	4	Cataract :			
Foreign bodies :		(a) Senile	1		
(a) Multiple (incendiary		(b) Traumatic	11		
bombs)	6	(c) Congenital	1		
(b) Thorn	5				
(c) Rust	3	<i>Diseases of the Vitreous.</i>			
(d) Emery	3	Traumatic hæmorrhage ...	1		
(e) Glass	2	Eales' disease	3		

<i>Diseases of the Choroid</i>		<i>Diseases of the Lacrimal Apparatus.</i>	
Rupture	1	Stenosis of canaliculi ...	8
Choroiditis	5	Stenosis of nasolacrimal duct	15
Myopic hæmorrhage ...	1	Acute dacryocystitis ...	5
Neoplasm (sarcoma) ...	1		
<i>Diseases of the Retina.</i>		<i>Intra-ocular Foreign Bodies.</i>	
Commotio retinæ (football)	2	Brass cartridge casing ...	1
Detachment (two trauma)	4	Portions of steel rivets ...	3
Degeneration (investigation)	8	Steel splinters	6
		Bomb splinters	1
<i>Diseases of the Optic Nerve.</i>		<i>Penetrating Wounds of the Globe.</i>	
Atrophy (investigation) ...	4	Thorns	2
Retrobulbar neuritis ...	1	Nails	3
<i>Diseases of the Orbit.</i>		Barbed wire	1
Cellulitis	1	Primary glaucoma	1
Hæmorrhage	1	Herpes zoster ophthalmicus	1
Total	345		

These figures show that 345 cases required in-patient treatment, i.e. in this series one case in every thirty and, apart from errors of refraction, one-sixth of all treatment cases were admitted to hospital.

Trauma accounted for 125 cases of the 345 in-patients. It may therefore be stated that in minor out-patient cases trauma accounts for one-twelfth and, in serious eye conditions, the proportion is one-third.

OPERATION ANALYSIS.

The following figures indicate the types of operation carried out in the treatment of 345 in-patients.

Major Operations Analysis.

<i>Lids.</i>		<i>Vitreous.</i>	
Trichiasis (diathermy) ...	2	Aspiration	3
Delayed plastic repair ...	4	<i>Retina.</i>	
Primary suture	3	Diathermy (Larsson, Safar.)	4
Tarsorrhaphy	1	<i>Globe.</i>	
Multiple Meibomian cysts	6	Enucleation :	
<i>Conjunctiva.</i>		(a) Trauma	2
Subconjunctival injections	10	(b) Absolute Glaucoma	2
Macrewnolds operation		(c) Sarcoma of the choroid	1
(pterygium)	1	<i>Orbit.</i>	
Peritomy	2	Exploration	2
Biopsy	1	Plastic repair (mucous membrane graft) ...	5
<i>Cornea.</i>		<i>Lacrimal Apparatus.</i>	
Cautery	8	Excision of lacrimal gland	2
Removal of foreign bodies (deep)	4	Incision of sac abscess ...	2
Trephine	1	Removal of sac	2
<i>Anterior Chamber.</i>		Plastic dilation of canaliculi	17
Paracentesis	3	External dachryocystostomy	4
<i>Iris.</i>		Probing	3
Division of anterior synechiæ	2	<i>Extra ocular muscles.</i>	
Optical iridectomy	1	Advancements and reces-sions	45
Excision of prolapse ...	1	<i>Magnet Extraction of Intra-ocular Foreign Bodies.</i>	
<i>Ciliary Body.</i>		Successful	8
Excision of prolapse ...	1	Unsuccessful	3
<i>Lens.</i>			
Curette evacuation	13		
Dissection	11		
Extraction (Simple) ...	1		
Total	181		

Thus 181 operations were necessary of which 58 were directly required for injuries.

The influence of trauma may therefore be regarded as follows:—

Total number of cases under investigation	...	...	10,000
Total number requiring major in-patient treatment	...	...	345
Total number requiring major operation	...	...	181
Minor out-patient cases	1,466	Trauma percentage	8·7
Major in-patient cases	...	345	Trauma percentage 36·4
Major operations	...	181	Trauma percentage 36·4

In this series two eyes were lost directly as a result of accident and in twenty-five eyes vision was seriously impaired.

CONCLUSION.

Prevention was investigated by careful inquiry of each patient: from these it was learnt that some simple form of protection would have been sufficient to prevent the injury.

An anti-gas eye shield would appear to be the handiest and most suitable protection.

Two measures would go far to preventing eye accident and disease in the Forces. The first recommendation is that the wearing of the anti-gas eye shield should be compulsory:

- (1) When hammering on metal or concrete, punching rivets and grinding.
- (2) In field operations in brushwood or thickets. The present type of forage cap and steel helmet afford no eye protection from swinging branches, etc.
- (3) When filling accumulators or using acids.
- (4) During enemy action, especially when dealing with incendiary bombs or charred material.
- (5) When lime spraying.

The second recommendation is the training of the unit medical officer in the treatment of eye disease. In this Command lectures and practical demonstrations have been held weekly for medical officers, sisters and nursing orderlies, the idea being to have someone in each unit familiar with ophthalmic treatment. Results have been very encouraging in diminishing severe conjunctivitis, obtaining early mydriasis in corneal ulcers and iritis and in the skilled removal of foreign bodies. An opportunity is thus given to young medical officers to fill in a gap so frequently left by under-graduate instruction and to increase their professional capital whilst with the Forces.

A REPORT INTO THE FIRST THOUSAND CASES ATTENDING THE EAR, NOSE AND THROAT OUT-PATIENT CLINIC OF A GENERAL HOSPITAL IN THE MIDDLE EAST.

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IN February, 1941, a report was published in the Journal by Major Craig on a similar subject from a hospital in a training area in England.

It may be interesting to compare the two reports and note the difficulties of a desert area.

The hospital area is situated in the desert in —.

There is one E.N.T. Specialist for four General Hospitals, one British, one Indian and two Combined.

Out-patient clinics for new patients are conducted at the British and Indian hospitals. The patients from the two Combined hospitals attend these clinics.

The climate is one of extremes. In the winter we had 14° of frost, and the summer saw the thermometer rise to 118° F. in the shade. Humidity varies between 5 to 100 per cent (Official Meteorological statistics kindly supplied by R.A.F.).

There has been heat stroke and frost bite. It is quite authentic that one field officer's precious dentures were missing from their oral home at breakfast one morning owing to the vice-like grip of a mug of frozen water at his bedside!

We are subjected to prolonged and violent sandstorms. The dust is blamed by many patients as a cause for their symptoms. It is used as a handy weapon for the "lead-slinger." In some cases of sinusitis (in the winter), deflected nasal septum and otitis externa, it would, however, appear true.

Patients who have carried on in civil life in England with slight nasal obstruction for years come complaining that their symptoms are aggravated by the dust. They frequently complain of frontal pain in addition.

The otitis externa is not caused by dust *per se* but by the homely methods of removal by the troops. A man usually sticks a dirty little finger into his external auditory meatus, causing abrasions which become infected, and many are the broken match ends removed from the depths of the canal!

The topee worn by the British troops, while providing excellent protection from the sun, causes profuse sweating beneath the leather hat band. This hat band sweat pours down the face and frequently finds its way into the external auditory meatus mixed with dust helping to form a good medium within the canal.

The majority of Indians wear a topee made or lined with cloth. This is better as it absorbs the sweat. In many cases the topees can be washed. The ideal headwear is, of course, the local agal and caffia which affords

protection from sun, sandstorms and the icy blast in the winter, absorbs sweat and can be washed.

The majority of the units in the area are not equipped for examination of the ear or upper air passages and many units have no means of treating the simplest of conditions. This accounts for the large number of simple and varied conditions referred for a Specialist's opinion.

During the period of a thousand new cases there were over three thousand out-patient attendances. Patients seen in the wards are not included in this report. Fifty-two per cent of cases seen were British and 48 per cent Indian.

EAR CASES							Number
Otitis media, acute	...	...	...	...	...	...	170
Otitis media, chronic suppurative	...	...	...	...	...	...	174
Otitis externa	...	...	...	...	...	...	73
Cerumen	...	...	...	...	...	...	52
DEAFNESS.							
(1) Chronic adhesive otitis media	...	...	...	...	...	...	42
(2) Otosclerosis	...	...	...	...	...	...	11
(3) Nerve deafness	...	...	...	...	...	...	13
(4) Hysterical	...	...	...	...	...	...	2
Traumatic rupture tympanic membrane	...	...	...	...	...	...	4
Fistula auris congenita	...	...	...	...	...	...	1
PINNA.							
(1) Laceration of	...	...	...	...	...	...	1
(2) Self inflicted wound of	...	...	...	...	...	...	1
(3) Sebaceous cyst of	...	...	...	...	...	...	1
(4) Perichondritis of	...	...	...	...	...	...	2
(5) Hæmatoma of	...	...	...	...	...	...	1
Bell's palsy	...	...	...	...	...	...	6
Temporo-mandibular arthritis	...	...	...	...	...	...	1
Total							555
NOSE CASES							Number
PARANASAL SINUS DISEASE.							Number
(1) Maxillary acute	...	...	...	...	...	...	7
Maxillary chronic	...	...	...	...	...	...	18
(2) Frontal acute	...	...	...	...	...	...	36
Frontal chronic	...	...	...	...	...	...	5
(3) Pan-sinusitis acute	...	...	...	...	...	...	3
(4) Vacuum frontal sinus	...	...	...	...	...	...	5
(5) Choanal polypi	...	...	...	...	...	...	2
NOSE.							
(1) Laceration	...	...	...	...	...	...	2
(2) Fracture	...	...	...	...	...	...	8
NASAL VESTIBULE.							
(1) Dermatitis	...	...	...	...	...	...	6
(2) Furuncle	...	...	...	...	...	...	3
NASAL SEPTUM.							
(1) Deflected	...	...	...	...	...	...	27
(2) Perforated	...	...	...	...	...	...	2
(3) Ulcerated	...	...	...	...	...	...	16
(4) Hæmatoma	...	...	...	...	...	...	2
Common cold	...	...	...	...	...	...	9
Hypertrophic rhinitis	...	...	...	...	...	...	14
Nasal polypi	...	...	...	...	...	...	7
Allergic rhinitis	...	...	...	...	...	...	1
Fibrinous rhinitis	...	...	...	...	...	...	4
Rhinoporioidosis	...	...	...	...	...	...	1
Dermoid	...	...	...	...	...	...	1
Obesity	...	...	...	...	...	...	1
Total							180

THROAT CASES						Number
Tonsillitis	(1) Acute	...	...	...	...	26
	(2) Chronic	...	...	...	...	58
Sarcoma tonsil	...	...	...	...	...	1
Laryngitis	(1) Simple	...	...	...	...	39
	(2) Tuberculous	...	...	...	...	5
	(3) Gumma	...	...	...	...	4
	(4) Atrophic	...	...	...	...	1
Aphonia hysterical	...	...	...	...	...	3
Thyroid	(1) Colloid goitre	...	...	...	...	1
	(2) Toxic adenoma with thyrotoxicosis and recurrent laryngeal paralysis	...	...	...	...	1
Recurrent laryngeal paralysis, U.D.	...	...	...	...	...	1
Fibroma vocal cord	...	...	...	...	...	1
Chronic superficial glossitis	...	...	...	...	...	1
Tracheitis	...	...	...	...	...	2
Bronchogenic carcinoma lung	...	...	...	...	...	2
Adenitis Neck	(1) Tuberculous	...	...	...	...	3
	(2) Syphilitic	...	...	...	...	1
Pharyngitis acute	...	...	...	...	...	3
Keratoses, pharynx	...	...	...	...	...	1
Gumma palate	...	...	...	...	...	1
Cyst of maxilla	...	...	...	...	...	1
Carcinoma cheek (buccal)	...	...	...	...	...	1
G.S.W. neck	...	...	...	...	...	1
Dental caries	...	...	...	...	...	5
Submaxillary calculus	...	...	...	...	...	1
Submaxillary fistula	...	...	...	...	...	1
Parotitis	...	...	...	...	...	1
Parotid fistula	...	...	...	...	...	4
Gingivitis	...	...	...	...	...	1
Total						171
NEGATIVE EXAMINATIONS						94
TOTAL						1,000

Otitis Media.—As in any ear, nose and throat out-patient department the acute and chronic ears were more numerous than any other disease.

The majority of acute cases was admitted to hospital and most of them were given sulphonamide. The routine dose was sulphonamide gr. ^{xxx} on admission, followed by gr. xv, four hourly, for seventy-two hours. On the fourth day gr. viiss were given four hourly for twenty-four hours and the fifth day gr. viiss were given eight hourly for twenty-four hours to complete the course.

The patients on sulphonamide were not necessarily confined to bed. They were given the choice of "bed" or "up." They were not on special diet. There were no calamities.

There was no hard and fast rule by which patients with acute *otitis media* should be on sulphonamide but the obvious early non-suppurative cases were given the drug.

In the latter part of the period under review it was found that patients on sulphonamide did not tolerate the intense heat. If the patient was admitted to a tented ward, this observation had to be borne in mind. I had to perform only one paracentesis. There were no operations for acute mastoiditis.

The local treatment in the early stages of acute *otitis media* with per-

foration was a careful aural toilet and a gauze wick of 10 per cent glycerine and ichthyol b.d. I am convinced that the toilet is the important part of local treatment. When the inflammation was subsiding a careful toilet and a dry wick were used. There was a tendency at the subsidiary hospitals to pack the meatus with 4 to 6 inches of half-inch gauze; this is wrong. All that is required is the simple insertion of a piece of gauze $1\frac{1}{2}$ inches long throughout the entire length of the auditory canal. Wool should not be "thumbed" into the external auditory meatus. Finally the daily wick is withdrawn and iodized boracic powder is insufflated on to the drum head.

And now we come to the eternal question of the "chronic ear." The whole trouble lies in the fact that otologists will not agree as to the disposal of these cases.

At a meeting of otologists at G.H.Q., M.E.F., held last year, which I had the honour of attending the problem was discussed at some length and it was decided that:—

(1) All cases of chronic suppurative otitis media should be "weeded out" from combatant units (including L. of C. troops).

(2) Such patients should be seen by the E.N.T. surgeon to be regraded. As a general principle, they should be Base troops, so that adequate treatment and supervision can be carried out.

(3) Treatment will be recommended by the E.N.T. surgeon and will depend on the location of the patients concerned.

The patient should be instructed how to clean out his own ear.

I must repeat that both drugs and M.I. Room equipment are limited. Therefore no fancy drugs were prescribed and it was no good asking the unit M.O. to perform an aural toilet on the patient as no aural dressing forceps were available and the provision of a head mirror and bull's eye lamp was out of the question. Thus the patient was in a position to perform just as good a personal toilet as he might expect from the unit M.O. He was therefore taught the simple art of personal aural toilet, that is, mopping his ear quite dry by matchstick spills of cotton-wool and finally swabbing the drum with spirit. It is important that the patients are shown this in detail with a demonstration of hand across vertex.

Deafness.—Under this heading come the cases other than those having deafness as a symptom of acute or chronic otitis media or wax. A large number had to be recategorized, the majority of these being placed in Category B6. A common complaint was that they could not hear sufficiently well for sentry duty.

In this country a high acuity of hearing is very essential to a sentry!

The prognosis in the cases of chronic adhesive otitis media was usually poor so the B6 category was particularly suitable.

The eleven otosclerotics were typical and all occurred in British soldiers.

Two cases of nerve deafness had positive Wassermann reactions. One followed cerebrospinal fever. Four followed gunfire. I was unable to follow these cases up.

Both cases labelled hysterical deafness were in Indians. One of these cases also had hysterical aphonia. In both cases the deafness was bilateral. These were most puzzling cases and it was most difficult to distinguish between hysterical deafness and malingering. Being unable to speak their tongue increased the difficulty considerably. Both had been seen by another otologist and one by the Consulting Psychiatrist to the Force. They were evacuated from this area so I was unable to follow their progress.

All cases of Bell's palsy occurred in Indians. One case was atypical in that there was no upward and outward movement of the orbit on attempting to close the eye on the affected side.

Nose Cases.—The most notable feature of these cases was the very small number of men with acute sinusitis admitted during the dusty summer months. The large majority occurred in the cold weather just as they do at home in England. The dust aggravated symptoms in some people who had not had previous trouble at home and who had been subjected to the radical antrostomy operation (Caldwell-Luc). In fact, I would go so far as to say that a man who had been subjected to a Caldwell-Luc should not be eligible for service in the desert.

The twenty-seven cases of deflected nasal septum were those in which it was causing symptoms *per se*.

It will be noted that no cases of epistaxis occur in this series. I have treated epistaxis as a symptom and in all cases a primary cause was discovered, usually mild ulceration of the anterior portion of the septum nasi. I think the dust was the prime factor in these cases. The series of events was dust, abrasion caused through nose-picking, scab, nose-picking. . . .

The case of obesity which found its way into the clinic was referred to me by the Jemadar M.O. because he found "breathing difficult." He was the fattest man I have ever seen for his height and was in the Indian Corps of Clerks. I referred him to the physician who agreed with my diagnosis!

I was unfortunate in being unable to prove the case of rhinosporidiosis microscopically as the patient refused surgical treatment. He presented with a subcutaneous œdema of the orbital cellular tissue below the right eye. The lachrymal sac washed through clearly and there was no evidence of paranasal sinus disease. At the moment of writing he is being treated by the physicians with tartar emetic.

Throat Cases.—Some cases of acute tonsillitis found their way to me by mistake on the part of the unit M.O. who sent a personal letter with the patient. These were naturally treated in the medical division. To transgress for a moment, it may be interesting to some to know that acute tonsillitis heads the list of admissions to this hospital, to date, of all diseases.

I saw fifty-eight cases of chronic tonsillar infection. Tonsillectomy was advised on the following criteria: (1) Repeated attacks of tonsillitis; (2) one or more attacks of peritonsillar abscess; (3) injection of fauces, and/or pus in the tonsil, associated with palpable enlargement of the tonsillar gland.

The case of sarcoma of tonsil was advanced when I saw him and he was sent home to India as there was no means of treatment here at that time.

Laryngitis.—With the short cold dusty winter came a particularly obstinate type of simple laryngitis mostly occurring in Indians. It was slow to respond to the usual lines of treatment but this may have been due to the patient being treated in tented wards. At night a tent assumes the outside temperature with great rapidity and the essential part of treatment of these cases is to have them nursed in a level temperature.

The five cases of tuberculous laryngitis were proven by the demonstration of the *Bacillus tuberculosis*.

The four cases of gumma were proven serologically.

The case of atrophic laryngitis produced broken brownish casts of his larynx on coughing in the morning. These casts were quite dry and it was only in the morning that the patient was inconvenienced.

Both cases of carcinoma of lung presented with hoarseness and showed paresis of the left recurrent laryngeal nerve on clinical examination.

The case of toxic adenoma presented with a hoarseness and left recurrent laryngeal paralysis.

The bulk of the negative examinations were cases referred by the physicians within the hospital.

My thanks are due to Colonel Sutton, late R.A.M.C., and Lieutenant-Colonel Read, I.M.S., for permission to forward these notes. Secondly I must thank Private Goodier, R.A.M.C., my orderly, who has kept an index of my cases.



Editorial.

DIPHtheria AND ITS EPIDEMIOLOGY.

THE Medical Research Council has recently published a Report on the Epidemiology of Diphtheria during the last forty years (Special Report Series No. 247) by W. T. Russell which brings the statistics, so far as they go, up to date in a very efficient form. We learn that the notification rate, based on the population of all ages, had slightly increased in England and Wales as a whole between 1921 and 1934. There was, however, an appreciable variety of increase in the main geographical regions, this being greatest in the north of England. It is unfortunate that the notifications have not been compiled according to the ages of the sufferers. "There are," as the author points out, "no national statistics of the ages of notified cases," and he definitely states that "if the notifications could be related to the part of the population in which the vast majority of the cases occur, namely the child population aged 0 to 15 years, the secular incidence would probably show a very much larger increase, because the proportion of children in the total population has steadily declined."

Part of the observed increase is due to more accurate notification; part to the inclusion of cases which were regarded by the practitioners as suspicious but which were later found in the course of investigation to be some other type of throat involvement. "This practice does not imply any lack of skill on the part of the physician but is evidence rather of a better understanding of the disease, since it is wiser to treat a case which may be diphtheria as serious than to wait the possible development of unmistakable grave symptoms."

The paper goes on to show that the incidence and mortality amongst children of pre-school age in the thickly populated Boroughs of London is always higher than in children of the same age in residential areas and that the case rates amongst school children and adults in the populous Boroughs have nearly levelled to the higher rates characteristic of school children and adults in more favourable surroundings—this as a consequence of the decline in the birth-rate and the diminution of overcrowding amongst the former, so that "there is now less chance of children in the lowest social grade acquiring immunity in their pre-school life."

The number of children immunized against diphtheria in Britain was small before 1940 but is now steadily rising. This will end, probably, in a gradual diminution in case incidence and mortality. As the author says, "There is very strong evidence that, immunization, particularly since the inclusion of the pre-school children, has reduced the morbidity in New York City and in Toronto;" and it is likely that it will be followed by a similar reduction in England. We may recall for our encouragement the following figures

which have been recorded in New York since active immunization was started:—

		Actual death-rates per 100,000	Calculated or expected death-rates
1931	...	15.2	40.4
1933	...	4.9	31.2
1940	...	0.8	24.0

With these satisfactory statistics in our minds it is well, perhaps, to review briefly the history of diphtheria as it was set forth by William Bulloch in another M.R.C. Report in 1923. The malady appears to have started in Spain somewhere about 1583. The Spanish physicians spoke of a disease which they called *morbus suffocans* or *garrotillo*, and there are excellent accounts of a severe epidemic of diphtheria by de Fontecha (1611), Villa Real (1611), Perez de Herrera (1615) and de Heredia (1688). "With the mouth wide open and the tongue depressed," says Villa Real, "I sometimes saw the apex (epiglottis ?) quite white coming up from the deeper parts of the throat and hindering swallowing, sometimes a kind of membrane (crusta) lining the fauces, throat and gullet." Italian physicians later described the same phenomena and W. Douglas (1736) wrote of it in America. The researches and publications of Pierre Fidèle Bretonneau (1778-1862) in France settled not only the clinical entity but the name—"diphtherite" or "diphtherie" (from *διφθερα*, pellis or exuvium). In 1871 Oertel tried to transmit the disease to rabbits and pigeons and, though it is impossible at this stage to verify the nature of his materials, he succeeded in bringing about a membranous disease, fatal in about forty-eight hours, in his subjects in a successive series from rabbit to pigeon and from pigeon to rabbit for six consecutive inoculations. It would appear that he was actually transmitting diphtheria. Klebs, in 1883, described bacilli in the diphtheritic membrane and Loeffler, in 1884, "issued his exhaustive and epoch-making work" on the cultivation of these bacilli "to which relatively little has been added from a purely ætiological point of view." He maintained and, in fact, proved "that this virus acted locally, in the first instance at any rate . . ." "on the ground that the local products had repeatedly produced the disease whereas the blood and internal organs had not." Roux and Yersin (1888) were the first observers to produce diphtheria toxin by forcing well-grown cultures of the bacillus through a Chamberland filter. And, finally, in 1890, Behring showed that immunity could be produced in animals by the development, after inoculation with toxin, of antitoxic properties in their blood serum. Roux and Martin were the first to employ the horse in the preparation of anti-diphtheritic serum but, as Bulloch points out, "History must assign unchallenged to E. Behring the merit of the discovery of antitoxin."

Clinical and Other Notes.

PORTABLE ALL-METAL DESTRUCTOR.

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AND

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IN field conditions there is often the need of a small, and portable, destructor by means of which a unit can burn excreta produced during a short occupation of a site.

To meet this need, an all-metal fæces destructor similar in principle to the large A.S.H. Standard Fixed Destructor has been designed and tried at the Army School of Hygiene. Although the tests of this apparatus have not been lengthy, and no data as to its life have therefore been obtained, the results were such as to justify publication of these descriptions and drawings so that the appliance can be tested under field conditions.

The body of the destructor is made from an ordinary 40-gallon steel drum. This is laid lengthwise and an opening is cut in its top side to form a feeding door. A burning hearth for the fæces, made from a half sheet of stout, perforated, corrugated iron, is fitted horizontally through the long centre of the drum. A flue is fitted at one end of the drum and provision for entry of the flame from an oil-and-water flash fire of horizontal "unit" type is made at the other end.

The general arrangement and details of construction are shown in the accompanying diagrams—figs. 1, 2, 3 and 4.

Fig. 1.—This shows the destructor in longitudinal section.

(a) The burning hearth of corrugated iron is supported on two removable crossbars and is itself movable and easy to replace when burned out: the lower corrugations are liberally perforated downwards with $\frac{1}{2}$ inch holes so that liquids drain through into the lower half of the drum where they are quickly evaporated. No separate urine tray is thus necessary.

(b) The long sides of the rectangular opening cut in the top of the drum are supported by removable bars passed longitudinally through the drum from end to end.

(c) The piece cut out is fitted with extensions (strips of sheet metal) all round so as to overlap the joint, thus forming a close fitting lid.

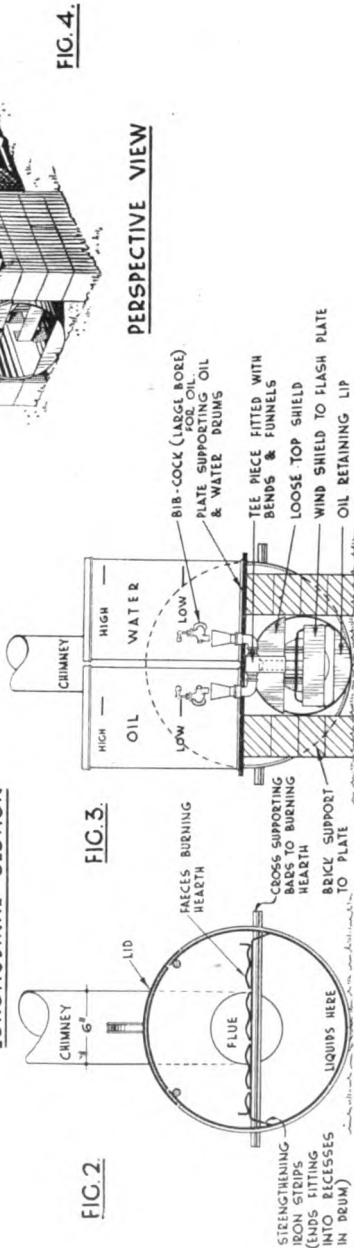
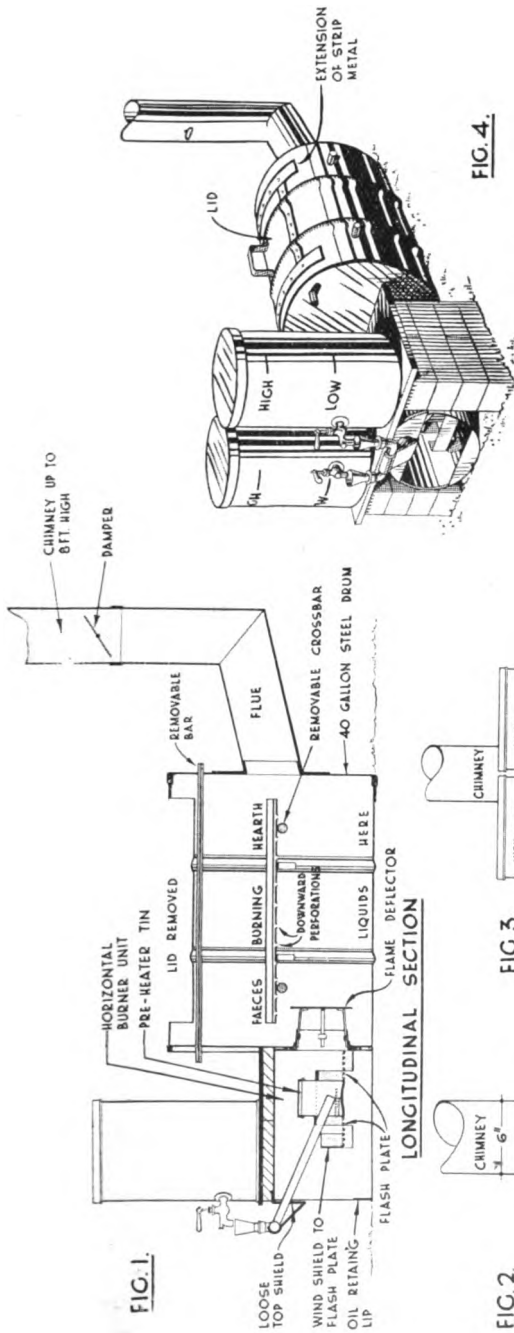
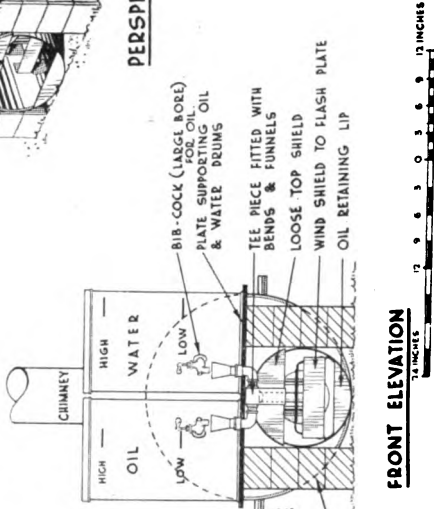


FIG. 3. FRONT ELEVATION



PORTABLE ALL-METAL DESTRUCTOR (ARMY SCHOOL OF HYGIENE)

(d) Most of the parts of the destructor can be made so that they may be stored inside the drum for transport, e.g. the cross bars (removed), the burning hearth, some sections of flue piping and the burner unit.

(e) The flue is so fitted that one-half of its inlet is below and one-half above the level of the burning hearth. Gases produced are thereby brought into contact with flame and are combusted.

(f) The horizontal burner unit shown is the latest A.S.H. type of burner (with pre-heater tin) fitted into a 5-gallon oil drum. The oil and water are run into the pre-heater tin, which is perforated with fine holes around and above the bottom, this tin resting on the shallow central dome of the flash plate. The cover to the pre-heater tin is kept on by a stout wire pin and the tin is held loosely in position by a metal "bridge" cut with a circular hole to accommodate the pre-heater. A loose top shield serves to support the higher end of the feed pipe and to assist in the protection of the flash plate from cold draughts. The flash plate unit can be made from one sheet of 1/12 inch gauge mild steel and is designed for easy removal from the drum into which it is placed hard against the forward end. A deflector or baffle plate to spread the flame is fitted to the narrow end of the burner unit.

Fig. 2.—This shows the cross section through the middle of the destructor. The cross supporting bars of the burning hearth should be noted as well as the two strengthening iron strips under the hearth which fit into the recesses in the sides of the drum thus preventing lateral movement of the burning hearth.

Fig. 3.—This shows a front elevation and illustrates also a simple feeding device for the oil and water which are run into funnels fitted respectively to two bends screwed into a "T" piece on the short feed pipe.

The oil and water containers stand on a hot plate over the horizontal burner unit. In this position, the oil and water are pre-heated and the oil conveniently thinned, thereby making for greater efficiency in combustion and economy in oil consumption.

The "High" and "Low" levels of oil and water in the containers should be noted and when either liquid reaches the "Low" level, it should be topped up to "High."

Fig. 4.—This gives a perspective view of the whole appliance as set up ready for use.

Tests.—A typical test gave the following result: the equivalent of 40 pounds faeces and 20 pounds urine was completely disposed of in forty-five minutes with the consumption of about one gallon of oil.

Note.—The destructor may be fixed on the surface of the ground supported by bricks or stones; or, to conserve heat, it may be sunk to half its depth into a trench, or banked up in a turf mound.

The authors are indebted to Colonel E. B. Allnutt, M.C., Commandant of the Army School of Hygiene, for permission to send these notes for publication.

THE SPIRONEMA OF CYPRIAN RELAPSING FEVER.

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INTRODUCTION.

A SERIES of cases of tick-borne relapsing fever among troops in Cyprus has been described by Wood and Dixon (in the press). The vector of infection was shown in all probability to be the tick *Ornithodoros tholozani* and the infection was generally acquired by men sleeping in earth shelters or caves. Some pathological features described in association with Cyprus cases (Dixon, 1942, in the press) are the almost general presence of urobilinuria and the fact that about 20 per cent of the cases have positive Kahn reactions.

It is stated that louse-borne relapsing fever cannot be transmitted to the guinea-pig but that the tick-borne variety can infect this animal. Accordingly, at the suggestion of Colonel J. S. K. Boyd, I attempted to infect guinea-pigs with the Cyprian spironema. Successful infection of these animals would constitute independent evidence incriminating the tick as the vector of the disease.

The present communication describes firstly the results of inoculation of guinea-pigs with the Cyprian spironema and secondly the morphology of the organism as isolated from these animals.

(1) ANIMAL INOCULATION.

An Indian soldier was admitted to hospital on November 16, 1942, complaining of vague abdominal pain. He gave a history of having spent a night in a cave while on manœuvres about two weeks previous to admission. No lice were found on his body or clothing. On November 22, 1942, he developed fever with a temperature of 101° F., and spironema was found in his blood by Major B. J. Doran, I.M.S., under whose care he was. On November 23, 1942, temperature was 103° F., and 5 c.c. of blood were drawn into 1 c.c. of sterile citrate. The specimen was then despatched to the laboratory and 0.5 c.c. of the citrated blood was injected intraperitoneally into a guinea-pig within two hours of removal from the patient. On December 2 a few spironemas were found in a thick drop film taken from the ear of the guinea-pig. On December 3 very numerous spironemas were present. This period of gross septicæmia lasted for at least three weeks. By January 3, 1943, however, no spironemas could be found in blood by microscopy and this state of affairs persisted until the animal was killed on January 7, 1943. Heart blood removed from the animal at the time of death gave a partially positive Kahn reaction, tube 1 being negative, tube 2 doubtful and tube 3 positive. The patient's blood was seropositive on the day of inoculation, being doubtful in tube 1 and positive in tubes 2 and 3. Sections of brain and spleen of guinea-pig stained by Levaditi's method failed to show any spironemas.

A second guinea-pig was infected by intraperitoneal passage of 0.04 c.c. of blood from first guinea-pig on December 14, 1942, while the blood of the former was heavily infected with the spironema. On December 15 a very few spironemas were found in blood of second guinea-pig. None however

could be found during the succeeding few days until December 21, when a few were seen. By December 23 the blood of this second guinea-pig was also swarming with the spironema. Heavy infection persisted in this animal for about three weeks, many being observed on January 11, 1943. The spironemas however had disappeared, so far as microscopy could elucidate, by January 14, 1943.

On January 15, 1943, a third guinea-pig and a rat were inoculated intra-peritoneally with blood from the second guinea-pig, although no spironemas could be detected in this blood by microscopic examination. The blood however was still infected, as both the *third* guinea-pig and the rat subsequently became infected with the spironema. In fact three days later a few spironemas were found in the blood of the third guinea-pig and by the fourth day it was heavily infected. The rat became mildly infected in six days though for the first three days after inoculation no spironemas could be detected in its blood. The rat remained infected for at least five days but at no time did it develop the gross septicæmia characteristic of the guinea-pigs. This is in contrast to louse-borne relapsing fever in which rats are stated to become heavily infected within forty-eight hours.

(2) MORPHOLOGY OF THE SPIRONEMA.

The spironema from the guinea-pigs was observed by two methods. Firstly thick drop blood films were stained by Field's or Leishman's stain and secondly wet films were examined by dark field illumination. The technique employed for the latter method was as follows: A drop of human serum (previously desensitized at 56° F. for serological tests) is mixed on a slide with one fourth of its volume of 3.8 per cent sodium citrate solution. A small drop of blood is taken from the ear of the infected guinea-pig by means of a capillary pipette and is mixed with the drop of fluid on the slide. A cover slip is applied and the preparation is blotted and ringed with vaseline. By this means the corpuscles of the guinea-pig are agglutinated by the human serum leaving clear spaces in which the morphology of the spironema is readily observed in clear serum free from corpuscles.

With the above technique using blood from infected guinea-pigs suspended in human serum the following results were obtained.

After about an hour from the time of setting up the preparation the spironemas have migrated away from the clumps of agglutinated corpuscles and are seen free in the clear serum. The spironema under these conditions remains alive and actively motile for over forty-eight hours. During this time there is little infection with other micro-organisms.

The spironema is a regularly coiled spirochæte. Its wave-length is about 2 μ . This agrees with measurements of other observers on the louse-borne type. It has between 3 and 11 coils. Its amplitude is about 1.5 μ . Its wave-length is quite constant being much more regular than in stained films. It is thus clear that the loose and irregular coils seen in stained films are the result of fixation. Sometimes, however, when alive, the spironema bends into loose secondary sinuosities but at no time does it lose its fine regular wave structure. It is of interest that when similar technique is applied to the spironema of Vincent's angina, the latter is

found to be very unlike the spironema of Cyprian relapsing fever. In a serum preparation examined by dark ground illumination, *Spironema vincenti* was found to possess loose and irregular coils with a wave-length of about 6μ and was not nearly so tightly coiled as the spironema of relapsing fever. *Sp. vincenti* has angular waves unlike the regular fine curves of *Sp. recurrentis*. It is clear that the spironema of relapsing fever is fairly close in morphology to *Treponema pallidum*.

The spironema of Cyprian relapsing fever under dark ground illumination shows a dark central core with brightly illuminated walls. Terminally these walls converge and no central dark zone can be seen. Sometimes spiral flagellæ are visible as very fine bright threads attached to the end of the organism. Double forms are often encountered joined end to end by constriction without any dark core. Sometimes double forms are united by a single fine spiral thread. These double forms have been seen to divide at the constrictions.

Cog-wheel or annular forms are frequently observed in these preparations. Here the spironema forms a continuous ring. It circulates in this ring rotating to and fro. A fine thread joins the two ends so that a complete circle is produced. It appears as if these annular forms result from entanglement of the flagellæ of one organism when bent on itself. These annular forms would explain the frequent occurrence of coiled rings seen in fixed films—but in fixed preparations the primary wave structure is lost.

The organism remains alive and actively motile in serum for more than two days. It appears to thrive under the anaerobic conditions present in such serum preparations without any attempt to maintain a constant temperature in its environment. Culture under such conditions would appear possible. The motility of the spironema consists of corkscrew like wave motion accompanied by spacial translation. The spironema also exhibits a lashing type of movement in which the organism bends on itself. It is sometimes contorted into loose secondary waves. Active wave motion in the fine primary coils is also seen in stationary organisms, especially in older preparations. Here, however, it is possible that the organism is stationary owing to anchorage of its flagellæ on the fine threads of fibrin which tend to form in these preparations.

SUMMARY.

(1) The spironema of relapsing fever contracted in Cyprus is transmissible to guinea-pigs. This substantiates the view that tick-borne relapsing fever occurs on the island since only this variety of the disease can infect the guinea-pig.

(2) The strain of spironema isolated was found to cause heavy infection of guinea-pigs four to twelve days after intraperitoneal inoculation. The heavy infection in which the blood is teeming with the spironemas persists for about three weeks. The blood, however, remains infective for a longer period as successful passage can be achieved later.

(3) The strain is infective to the rat but this animal apparently does not show heavy infection.

(4) The spironema is best studied by suspending blood from a heavily infected guinea-pig in human citrated serum and then examining by dark field illumination. Under these conditions the spironema remains alive and actively motile *in vitro* for at least forty-eight hours. It can readily be observed in the clear serum apart from the clumps of agglutinated corpuscles.

(5) The living spironema of Cyprian relapsing fever has a wave-length of about 2μ . It is extremely constant in wave-length which is shorter and very much more regular than that observed in fixed films. Its amplitude is only slightly shorter than its wave-length. It has between 3 and 11 coils.

(6) The living spironema of relapsing fever is very different in structure from that of Vincent's angina. The latter when examined alive by the same technique has open irregular waves like those seen in fixed preparations and with about three times the wave-length of the living spironema of relapsing fever.

(7) Wheel-like annular forms are frequently encountered in these serum preparations of the spironema of Cyprian relapsing fever. In these the spironema forms a complete highly motile circle. A fine thread is seen to join the two ends of the spironema so that it seems likely that the annular forms are produced by entanglement of the terminal flagellæ of one organism. These annular forms revolve, spinning to and fro.

I am very grateful to Colonel J. S. K. Boyd for suggesting that inoculation of guinea-pigs should be attempted and for his continued advice and encouragement. I also wish to thank Major B. J. Doran, I.M.S., for his kind co-operation in sending blood from an infected patient and for providing me with his case notes; and Corporal R. Nicholson, R.A.M.C., and Private W. Fuller, R.A.M.C., for valuable assistance.

A CASE OF PNEUMOCOCCAL MENINGITIS WITH RECOVERY FOLLOWING CHEMOTHERAPY.

BY MAJOR ALEX. H. IMRIE, M.B., M.R.C.P.,
Royal Army Medical Corps,

AND

EFFIE F. A. ELIAS, L.R.C.P., M.R.C.S., D.P.H.

BOMBARDIER W., a previously healthy man aged 32, was admitted to hospital on the evening of August 21, 1942, with a provisional diagnosis of sandfly fever. For two days he had suffered from slight frontal headache, generalized muscular pains and sensations of heat and cold. He had, however, carried out his usual duties up to the afternoon of the day of admission to hospital.

On admission he complained of moderately severe frontal headache and general malaise. The face was flushed and the skin hot and dry. Temperature 102° F. Pulse 92/min. Physical examination revealed no abnormality and he was bright and alert mentally. There was no history or other evidence of sinusitis or otitis media. A blood film showed no malarial parasites. After a restless night he was examined at 0930 hours on August 22 when his condition was unchanged. Temperature 102° F. Pulse 90/min. Thereafter the progress of the case was extremely rapid and is summarized in the following notes.

August 22.—1130 hours: Headache much more intense. Nuchal rigidity pronounced. Kernig's sign negative. Right plantar reflex extensor. No other abnormality detected on physical examination. Perfectly clear mentality. W.B.C. 30,600 c.mm.; P. 88 per cent, L. 8 per cent, M. 4 per cent.

1215 hours: Lumbar puncture. Cerebrospinal fluid under slightly increased pressure, clear to the naked eye but microscopically there were 359 cells per c.mm., of which 90 per cent were polymorphs; and an organism with the morphological character of the pneumococcus was present. The nature of the organism was confirmed on culture but its type was not determined.

1400 hours: Given M & B 693. 2 g., by mouth.

1500 hours: Vomited. The general condition was now poor; he lay apathetically in bed in a light stupor and answered questions slowly and dully. Headache intense. Nuchal rigidity pronounced.

1600 hours: Dagenan (M & B Sol.), 1 g. intravenously and 1 g. intramuscularly.

1800 hours: Condition unchanged. Dagenan 2 g. intravenously.

1900 hours: Rigor temperature 105° F.

2200 hours: Catheterized, urine normal. Dagenan 2 g. intramuscularly. His condition was now rather better, his mental state was clearer. M & B 1 g. by mouth was given four hourly, no vomiting occurred.

August 23.—0900 hours: Following a fairly quiet night his general condition was much better and he was mentally clear. Headache much less severe. Nuchal rigidity present but much diminished. He complained of some dimness of vision and was examined by an oculist who reported that the fundi were normal but that there was a degree of myopia.

1145 hours: Lumbar puncture. Cerebrospinal fluid under normal pressure, hazy but sterile.

1900 hours: Sulfadiazine 3 g. intravenously begun and continued four-hourly for four doses.

August 24.—0900 hours: No headache. Nuchal rigidity almost gone. Perfectly clear mentally. Right plantar reflex flexor. W.B.C. 13,000 c.mm. P. 74 per cent, L. 20 per cent, M. 6 per cent.

1130 hours: Lumbar puncture. Cerebrospinal fluid under very low pressure was slightly hazy; only a very small quantity was obtained, all of which was used for chemical analysis. Sulfadiazine was continued in doses of 3 g. by mouth, at first at eight hourly intervals but, on August 26 there was a scanty growth of pneumococcus from the cerebrospinal fluid and the dose was increased to 3 g. every four hours for eleven doses up to August 28, on which date three further doses were given and then discontinued. The general condition, which was already good by August 24, became even better and, on August 28, he appeared perfectly well. The cerebrospinal fluid was normal on August 27 and the last lumbar puncture, done on September 1, yielded a perfectly normal fluid under normal pressure. On September 1 W.B.C were 7,200 c.mm. He was allowed to go on leave on September 17.

When last seen on October 11 he was perfectly fit and there were no sequelæ.

Date	Cells	P. %	L. %	Protein mg. %	Chlorides mg. %	Culture	Sulfa- diazine given grammes	Sulfa- diazine C.S.F.	Conc. Blood
22.8.42	359	90	10	80	710	Pneumo.	—	—	—
23.8.42	1469	90	10	—	—	Sterile	—	—	—
24.8.42	—	—	—	—	—	—	15	10.5	16.4
25.8.42	102	+	—	—	—	Scanty pneumo.	9	—	8.3
26.8.42	—	—	—	—	—	—	9	—	—
27.8.42	1	—	—	—	—	Sterile	18	13.6	21.84
28.8.42	—	—	—	—	—	—	21	—	—
1.9.42	1	—	—	—	—	Sterile	—	—	—

NOTE ON CHEMOTHERAPY EMPLOYED.

Between 1400 hours on August 22 and 2300 hours on August 28, this patient received M & B 693 by mouth, 6 g.; Dagenan intravenously 3 g. and intramuscularly 3 g. Thereafter he was given sulfadiazine, intravenously, 12 g. and, by mouth, 60 g.

In the first twenty-four hours he received M & B 693 and Dagenan combined 12 g. In the second twenty-four hours sulfadiazine 15 g. In the third twenty-four hours sulfadiazine 21 g., in the fourth twenty-four hours sulfadiazine 18 g. and in the fifth twenty-four hours sulfadiazine 18 g.

The concentration of sulfadiazine in the cerebrospinal fluid and the blood was 10.5 mg. per cent and 16.4 mg. per cent respectively at the end of forty-eight hours and 13.6 mg. per cent and 21.84 mg. per cent respectively at the end of ninety-six hours.

COMMENT.

The chief features of interest in this case are:—

(1) The extremely sudden onset of symptoms of which mental phenomena were a striking feature; (2) the very rapid deterioration in the mental and physical state; (3) the dramatic response to chemotherapy.

Two other examples of pneumococcal meningitis, seen recently, are of interest in relation to the present case. Detailed notes are not available but the histories are briefly as follows:—

Both men went to bed apparently in average health; during the early hours of the morning both became suddenly delirious, then very rapidly stuporose and finally comatose. Lumbar puncture, performed in both cases approximately five hours after the onset of symptoms, yielded a turbid fluid from which a pneumococcus was cultured. Dagenan 2 g. was given intravenously in each case but both men died within nine hours of the onset of the symptoms. The two cases were quite unrelated both in time and place.

ACKNOWLEDGMENT.

Our thanks are due to Colonel R. R. G. Atkins, O.B.E., M.C., for permission to forward this case for publication and to Lieutenant-Colonel W. L. Lamb, R.A.M.C., for his helpful advice.

FAT EMBOLISM.

By MAJOR D. H. SANDELL, F.R.C.S.,
Royal Army Medical Corps.

THE condition of "fat embolism" is one which is familiar to all students who have to learn the complications of fractures but is usually forgotten by clinicians.

It is one which is very rare, perhaps because very few fatalities are caused by it, and it is often unrecognized. Cases that die after injury are usually labelled "Surgical Shock."

A memorandum on Medicine from the Middle East was published on November 16, 1942, on the subject.

It points out that "fat embolism occurs whenever certain conditions are present together: rupture of connective tissue cells liberating liquid fat, rupture of adjacent veins thus affording a portal of entry and physical conditions which cause the free fat to pass into the circulation. These features are commonly found in fractures of the long bones.

"The fat passes to the right side of the heart, and thence to the lungs where the droplets lodge in the capillaries causing local congestion, œdema and patches of inflammation. In many cases some fat globules are passed through the pulmonary circulation and reach the systemic circulation. The organs chiefly affected are the heart, brain and kidneys.

"The clinical picture varies. In a typical case there are three phases, the silent, the pulmonary and the cerebral.

"After the accident there is a period averaging about three days during which the patient, apart from his injuries, seems well. The second phase starts with pain in the chest, dyspnœa, cyanosis, restlessness and sweating. The pulse, temperature and respiration rate are all raised. If the patient survives he will develop a cough with sputum and signs of consolidation will appear. Microscopic examination of the sputum reveals the presence of fat globules.

"The third stage is characterized by cerebral symptoms, irritability passing on to stupor, without any localizing signs or changes in the cerebro-spinal fluid. Petechial hæmorrhages over the chest, shoulders and front of the neck are found in many cases, suggesting that the emboli have been distributed largely in the subclavian arteries.

"The diagnosis of fat embolism should be considered in all cases of injury developing pulmonary or cerebral symptoms, particularly when the symptoms appear in this order and between the second and fifth days. A characteristic feature is the free interval which distinguishes fat embolism from surgical shock and cerebral injury with which it is most likely to be confused.

"The only useful treatment is the administration of oxygen in a B.L.B. mask."

The following is an account of the history of a patient who sustained a fracture of the left tibia and died within forty-eight hours.

An air-mechanic, aged 21, was admitted to No. 6 (EA) General Hospital on January 10, 1943, with a fracture of the left tibia, sustained while playing rugby. There was a large amount of swelling at the site of the fracture—the mid shaft—but no gross displacement. The limb was put up in a back splint with side pieces. X-ray showed a simple crack through the shaft of the tibia with no displacement.

Next morning his temperature was 103.4° F., P. 108, R. 24, but he was fairly comfortable with no special symptoms, except dyspnoea. The temperature was thought to be due to malaria but the blood slide was negative for malaria parasites.

Later in the day he became restless, stuporous and lapsed into unconsciousness—unable to be roused. Respirations were rapid and temperature 104° F., P. 128.

Examination of the central nervous system was negative.

Discs normal. Reflexes normal. No neck rigidity. Babinski doubtful.

General examination of the urine was negative.

Lumbar puncture was performed. The fluid was clear, and the pressure slightly increased. Microscopic examination showed no pus or organisms.

Examination of lungs showed fine crepitations at right apex and middle lobe and also rales left base. The spleen was not palpable.

His condition was thought possibly to be apical pneumonia with cerebral symptoms or possibly cerebral malaria and he was given the appropriate treatment.

Towards morning, i.e. 04.00 hours, January 12, his temperature rose to 107° F. and he suddenly collapsed and died.

POST-MORTEM FINDINGS. DATE JANUARY 12, 1943.

“Body of healthy young adult. No rash or external marks visible.

Brain: Membranes slightly injected, no œdema present.

Cut surface: Vessels more obvious than usual: minute thrombi appear to be present. In all areas of subcortex small, almost pin point hæmorrhages present. Nil else to note.

Thorax: Lungs, copious frothy fluid present, especially at bases. No petechiæ on pleura.

Heart: Firm, contracted. Valves healthy, no excess of fluid in pericardium.

Endocardium: Widespread petechial hæmorrhages throughout all chambers.

Abdomen: Organs all appear healthy. Spleen: Normal size and consistency. No evidence of malaria.

Smears of brain substance: No M.P. found. Tissue from brain, heart and lungs have been taken for sections.

Tibia: Recent fracture of the mid shaft, considerable effusion and extravasation of blood into surrounding tissues.

Opinion.—No evidence of cerebral malaria but findings consistent with multiple fat embolism.”

Specimens from the lungs and brain were sent to the Medical Research Laboratory at Nairobi, and the pathologist reported that “the diagnosis of fat embolism is undoubtedly correct. The lung capillaries are loaded with fat and there are focal areas in the cerebral cortex in which the blood vessels contain multiple cylindrical fat emboli.”

COMMENT.

The outstanding feature in this case is the rapidity of the onset of symptoms and their progress to a fatal termination. The three phases, the silent, the pulmonary and the cerebral, were all over in less than forty-eight hours. The silent phase, in a typical case, should have lasted three days. In this case it lasted a few hours only with corresponding rapid progression of the other stages.

I wish to express my thanks to Colonel W. Millerick, *M.C.*, Officer Commanding No. 6 (EA) General Hospital, for permission to forward this case for publication.

Reviews.

CANNED FOODS. An Introduction to their Microbiology. By J. G. Baumgartner. London: J. & A. Churchill, Ltd. 1943. Pp. viii + 157. Price 10s. 6d.

This book, written by Mr. Baumgartner, senior bacteriologist to Messrs. Crosse & Blackwell, Ltd., deals with the bacteriology of canned food and its relation to spoilage.

Chapters are devoted to the principal spoilage organisms of canned food and their control together with a full account of the laboratory examination of canned food. Most useful information is given on canning operations, including heat preserving and the examination of can seams. Various types of cans are also described.

The book is full of valuable information which is seldom found elsewhere, references are plentiful and, to those who wish for further information, invaluable. It is up to date and is the result of much work on the part of the author.

It is a very readable book with clear print and a useful index is provided.

THE EAR, NOSE AND THROAT IN THE SERVICES (Oxford War Manuals). By R. Scott Stevenson, *M.D.*, *F.R.C.S.Ed.* Oxford University Press. London: Humphrey Milford. 1943. Pp. xii + 116. Price 5s.

This book is written for "the average medical officer" in the Services. Such an officer who wishes to do something more than refer all patients with ear, nose, and throat symptoms to a specialist will do well to get this handy manual. (The book measures 6½ by 4½ inches and weighs only 8 ounces.) He will find he has a most readable little guide to this branch of medicine pervaded with the personal note of one who wishes to convey to others the practised points of his considerable experience; and one imagines there are few otologists who would not be glad to learn of one or more of the practical tips that Major Scott Stevenson records here.

Whilst it is realized that the writer of such a short book must be dogmatic several statements cause some surprise. Eustachian catheterization every day for a week seems rather drastic for acute catarrhal otitis media: chronic tonsillitis and sinusitis are mentioned as causes of this condition but not adenoids, which are at least as common a cause. No mention is made of the help in functional aphonia that the psychiatrist can give in the treatment and prognosis of the underlying mental condition.

The reviewer, a working otologist in the R.A.M.C., thoroughly endorses the emphasis laid on single methods of treatment, the relatively few drugs necessary, the importance of general health and habits in the ætiology and course of "chronic nasal catarrh" and the advocacy and detailed account of the "dry" treatment of chronic middle-ear suppuration with boric acid powder or iodized powder.

This is, in effect, an elementary handbook of oto-rhino-laryngology in which are emphasized the special problems that may arise in dealing with service personnel.

NOTES FOR THE R.M.O. OF AN INFANTRY UNIT (Oxford War Manuals). By C. P. Blacker, M.C., M.A., F.R.C.P., late R.M.O. 2nd Battn. Coldstream Guards. Oxford University Press. London: Humphrey Milford. 1943. Pp. ix + 77. Price 5s.

A most useful book, containing numerous practical suggestions. It illustrates the many and varied aspects in the life of the R.M.O.

J. C. A.

SUTHERLAND'S FIRST AID TO INJURED AND SICK. Revised and rewritten by Halliday Sutherland, M.D. Edinburgh: E. & S. Livingstone. 1943. Pp. 77. Price 9d. net.

It is difficult to comprehend how so much useful information could be compressed into a booklet of this size.

J. C. A.

YOU AND YOUR COMRADES. Front Line Treatment of Wounds (Home Guard Medical Manual). By the Medical Officer to Midlothian Battalion, Home Guard. Edinburgh: E. & S. Livingstone. 1943. Pp. 31. Price 4d. net.

The strategical, practical, administrative and first-aid aspects of the Home Guard medical organization are very clearly set out in everyday language and all are treated in a sound common-sense manner.

J. C. A.

AFTEREFFECTS OF BRAIN INJURIES IN WAR. By Kurt Goldstein, M.D. London: William Heinemann (Medical Books), Ltd. 1942. Pp. 244. Price 21s.

In this book, which is based upon the clinical application of psychological methods, the author sets forth his views on the evaluation and treatment of

after-effects of war injuries of the brain. The book is well written and Dr. Kurt Goldstein is to be congratulated upon succeeding in expressing himself so clearly in a language other than his own. At times he is perhaps a little too discursive but as a whole the book forms an important contribution to the subject representing, as it does, the result of many years' experience in the problems of applied psychology relating to this particular field of work. As Professor Denny-Brown indicates in his foreword, such a publication is particularly apposite at the present time when, at any moment, these problems may assume dimensions of national importance. In a generous bibliography, comprising those references relevant to his theme, Dr. Goldstein perhaps fails to do justice to the contributions made by English workers to the elucidation of traumatic cerebral lesions.

Notice.

VISITORS' BOOK, ROYAL VICTORIA HOSPITAL, NETLEY.

THE original (pre-1917) "Visitors' Book" of the Royal Victoria Hospital, Netley, cannot be found.

This was of considerable historic interest and was kept in a glass-topped case in the Main Hall.

It is reputed to have last been seen about 1928 with many of the original signatures of Royalty, etc., cut out.

Will any serving or retired officer of the Corps who has any recollection of the said book or knowledge as to its present whereabouts kindly communicate with the Officer Commanding, Royal Victoria Hospital, Netley.

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The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in duplicate through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps, and articles of a non-scientific character, may be accepted for publication under a nom-de-plume.

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JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

Corps News.

AUGUST, 1943.

EXTRACTS FROM THE "LONDON GAZETTE."

July 22, 1943.—The KING has been pleased to approve the following awards in recognition of gallant and distinguished services in the Middle East:—

The Military Cross.

Capt. Brian Patrick Tully, M.B. (195205), Royal Army Medical Corps (Dublin).

The Military Medal.

No. 7375243 Private John Webster Buchanan, Royal Army Medical Corps (Glasgow, C.3).

No. 7387207 Private John Douglas Lennox, Royal Army Medical Corps (Birmingham).

No. 7401363 Private John Shaw, Royal Army Medical Corps (West Hartlepool).

The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in North Africa:—

The Military Cross.

Capt. Harold Douglas Eddy, B.M. (223985), Royal Army Medical Corps (Truro, Cornwall).

The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Burma:—

The Military Cross.

Capt. Ronald Edsger Johnson, M.B.E. (135652), Royal Army Medical Corps (Keighley, Yorks).

Capt. Charles Skelton Smalley (133668), Royal Army Medical Corps.

The Military Medal.

No. 7383239 Pte. Frederick Griffiths, Royal Army Medical Corps (Gloucester).

The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the field:—

The Distinguished Service Order.

Capt. Edward Theodore Gilbert, O.B.E., M.B. (108109), Royal Army Medical Corps.

The Military Medal.

No. 7362709 Pte. Edward Charles Sturrock, Royal Army Medical Corps.

August 5.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in Tunisia:—

To be Additional Commanders of the Military Division of the said Most Excellent Order:—

Col. (temp.) Alexander Bremner, M.C., T.D., M.D. (40490), Royal Army Medical Corps.

Col. (temp.) Douglas Gordon Cheyne, O.B.E., M.C., M.D. (14491), Royal Army Medical Corps.

Col. (temp.) Edward Eric Spencer Wheatley, D.F.C. (5995), Royal Army Medical Corps.

The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Persia-Iraq:—

The Royal Red Cross.

To be Additional Members of the Royal Red Cross, First Class:—

Miss Ella Moore Bell (206364), Matron (acting Principal Matron), Queen Alexandra's Imperial Military Nursing Service (Shooter's Hill, S.E.18).

Miss Eva Emily Hester (now Mrs.

Humble) (206209), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Mickleover, Derby).

Miss Annie Hughes (208409), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Newbridge, Denbighshire).

Miss Dorathea Letitia Underhill (206498), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Farnham, Surrey).

Miss Victoria May Whiteman (206507), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Rutherford, Sussex).

August 5.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in Persia-Iraq :—

Commands and Staff.

Major-Gen. (acting) J. G. Gill, D.S.O., O.B.E., M.C., M.B. (8368), late R.A.M.C.

Brig. (temp.) C. D. K. Seaver (9190), late R.A.M.C.

Royal Army Medical Corps.

Col. (temp.) W. M. Cameron, O.B.E., M.B. (5585).

Col. (temp.) J. J. Magner, M.C., M.B. (8718).

Col. (temp.) T. H. Sarsfield (15326).

Col. (temp.) C. Scales, M.C. (5164).

Lt.-Col. L. B. Clarke (15665).

Major (temp. Lt.-Col.) W. A. D. Drummond (31405).

Major (temp. Lt.-Col.) P. J. Richards (51985).

Major (temp. Lt.-Col.) T. Seager, M.B. (66352).

Capt. (temp. Major) D. J. Wigginton (74417).

Capt. G. A. C. Miller (133631).

Capt. W. C. Wightman, M.B. (111840).

7261817 S/Sjt. (acting W.O.II

(Q.M.S.)) E. McMahon.

7523071 S/Sjt. F. A. Booth.

7357219 Sjt. (acting S/Sjt.) K. Tempest.

7260636 Sjt. H. K. W. Aucock.

7262801 Sjt. H. Cudmore.

7081626 Sjt. N. E. Spyvee.

7348505 L/Sjt. D. G. Dougall.

7523390 L/Cpl. L. Kenyon.

7533008 Pte. H. Jones.

7535944 Pte. W. Murray.

Queen Alexandra's Imperial Military Nursing Service.

Miss J. W. M. Waters, Sister (acting Matron) (P.206537).

Miss D. A. Ross, Sister (acting Assistant Matron) (P.209081).

Miss O. E. Clark, Sister (acting Assistant Matron) (P.206063).

Miss M. F. Sullivan, Sister (209217).

July 16.—Col. (temp. Brig.) (local Maj.-Gen.) W. C. Hartgill, O.B.E., M.C. (8648), late R.A.M.C., to be Major-Gen., from June 1, 1943.

Col. R. W. Vint, M.B. (26290), late R.A.M.C., on completion of four years in the rank, is retained on the active list supern. to estabt., July 15, 1943.

Lt.-Col. G. A. Bridge, M.C., M.B. (14074), from R.A.M.C., to be Col., July 15, 1943, with seniority from June 30, 1940.

The undermentioned Majors to be Lt.-Cols. :—

July 15, 1943.—Temp. Lt.-Col. E. O. A. Singer, M.B., M.R.C.P. (1846).

A. G. Harsant, O.B.E., M.D., M.S., F.R.C.S. (6767), and remains seconded.

Capt. N. F. Field (42270), h.p. list (late R.A.M.C.), retires on account of ill-health, July 17, 1943.

July 20.—The undermentioned Capt. to be Majors :—

July 2, 1943.—(War Subs. Major) R. A. Stephen, M.D. (63177).

(Temp. Major) A. G. D. Whyte, M.B.E., M.B. (56558).

J. S. Ruddell, M.B. (63160).

July 3, 1943.—(War Subs. Major) T. McG. McNie, M.B. (56405).

July 10, 1943.—(War Subs. Major) D. M. Ahern, M.B. (56530).

July 23.—Capt. P. J. Daly, M.B. (75582), relinquishes his commn. on account of ill-health, July 23, 1943, retaining his rank.

July 27.—Col. E. P. Allman Smith, O.B.E., M.C., M.B. (4819), late R.A.M.C., on completion of four years in the rank, is retained on the Active List, supern. to estabt., August 1, 1943.

Lt.-Col. (temp. Col.) E. B. Marsh, M.C., M.B., M.R.C.P. (8717), from R.A.M.C., to be Col., August 1, 1943, with seniority July 1, 1940.

Major (War Subs. Lt.-Col. (temp. Col.)) J. P. MacNamara, M.B. (5347), to be Lt.-Col., August 1, 1943.

July 30.—Col. (temp. Brig.) (acting Major-Gen.) T. O. Thompson, C.B.E., D.M. (4850), late R.A.M.C., to be temp. Major-Gen., July 31, 1943.

Lt.-Col. J. P. Duguid (24151), from A.D. Corps, to be Col., September 1, 1942, with seniority October 1, 1938. (Substituted for the notfn. in "Gazette" (Supplement) dated September 22, 1942.)

Lt.-Col. (temp. Col.) H. L. McCallum (10654), from A.D. Corps, to be Col.,

October 18, 1942, with seniority July 22, 1939. (Substituted for the notfn. in "Gazette" (Supplement) dated November 6, 1942.)

Lt.-Col. G. F. Charles (15721), from A.D. Corps, to be Col. July 1, 1939, with seniority July 26, 1938. (Substituted for the notfn. in "Gazette" (Supplement) dated July 8, 1939.)

The undermentioned to be Majors:—

July 27, 1943.—Capt. (temp. Major) J. D. P. Macpherson, M.B. (56534).

Capt. (temp. Major) L. G. Irvine, M.B. (56537).

August 6.—Major-Gen. G. Wilson, C.B.E., M.C., K.H.S. (26291), late R.A.M.C., is granted the local rank of Lt.-Gen., June 1, 1943.

The undermentioned Capts. (Qmr.) ret. pay (late R.A.M.C.), to be Bt. Majors (Qmr.):—

June 6, 1941.—J. P. Springett (39610).
February 22, 1943.—H. B. Lee, O.B.E. (10354).

August 10.—Major (War Subs. Lt.-Col.) (temp. Col.) W. M. Cameron, O.B.E., M.B. (5585), to be Lt.-Col., July 7, 1943. (Substituted for the notfn. in "Gazette" (Supplement) dated July 9, 1943, under Emergency Commns.)

August 13.—Lt. Col. (temp. Col.) J. Higgins (15775), having attained the age for retirement, is retained on the Active List supern. to the estab., August 8, 1943.

The undermentioned Consultant, R.A.M.C., is promoted to local rank of Brig., July 23, 1942.

War Subs. Lt.-Col. (temp. Col.) R. O. Ward, D.S.O., O.B.E., M.C., T.D., M.Ch., F.R.C.S. (24275).

THE ARMY DENTAL CORPS.

July 20.—Lt.-Col. H. O. Sumerling (15739) retires on ret'd. pay, July 1, 1943.

August 6.—Capt. H. C. Dobbie (58239)

to be Major, August 1, 1942. (Substituted for the notfn. in "Gazette" (Supplement) dated February 5, 1943.)

ROYAL ARMY MEDICAL CORPS COMFORTS GUILD.

The Committee of the Royal Army Medical Corps Comforts Guild, acknowledge with grateful thanks the following donations to the Fund received within the past three months. In addition, several individual subscriptions and bankers orders (half yearly) have been received from officers serving at home and overseas.

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PRESENTATION OF DRUMS TO A DEPOT AND TRAINING ESTABLISHMENT, R.A.M.C.

A ceremony, believed to be the first of its kind in the history of the Corps, took place at a Depot and Training Establishment, R.A.M.C., on Sunday, June 6, 1943, when — Primary Training Centre presented to the Depot, R.A.M.C., under the command of Lt.-Col. R. N. E. Watt, R.A.M.C., a pair of side drums to mark their appreciation of the work and co-operation of the Depot during the period these units have occupied the same establishment.

The parade was drawn up on the great central lawn, which was big enough to

Colonel S. McK. Saunders, A.D.M.S., West Riding District, were in attendance.

The parade was drawn up in hollow square facing the saluting base, where the ceremony began with a short service and address by the Rev. J. James, Asst. Chaplain General, Northern Command, assisted by the Rev. S. Odom, S.C.F. — Garrison, and was attended by many visitors. At its conclusion, the drums were presented to the Officer Commanding Depot by the Officer Commanding Primary Training Centre, and were then



[*Photograph by courtesy of the "Yorkshire Post."*]

contain easily the 1,400 troops of the combined Services present—the Primary Training Centre, Depot and Training Establishment, R.A.M.C., and Company Sub District Group A.T.S. The Band of the West Yorkshire Regiment (Prince of Wales' Own), and the Pipes and Drums of the Depot were present. The parade was under the command of the G.O.C. West Riding District. At the saluting base Major-Gen. P. H. Mitchiner, C.B.E., T.D., K.H.S., D.D.M.S., Northern Command; the Colonel Commanding Sub District; and

trooped first in slow time, the escort being an armed guard of P.T.C.; then in quick time escorted by an unarmed guard R.A.M.C. The parade then marched past and the District Commander took the salute.

Some idea of the strength of the parade may be judged by the fact that, headed by the Band of the West Yorks Regt., it took twenty minutes for the troops marching in column to pass the saluting base.

PRISONER OF WAR AND MISSING.

Prisoner of War.

Capt. J. W. Goronwy, N.E.I.

Missing.

Major R. A. Fonca, at Sea.

Major R. Ramsay, Burma.

Capt. W. S. Aird, Burma.

Capt. G. I. W. Lusk, Burma.

Capt. H. T. Richmond, at Sea.

Lieut. J. Phillips, at Sea.

Lieut. R. A. S. Watt, at Sea.

DEATHS.

MACDONALD.—The following appreciation of the late Lieutenant-Colonel Angus Macdonald, killed in action in Tunisia on May 9, 1943, has been received:—

"Angus Macdonald was deservedly popular wherever he went, a lover of humanity and gifted with exceptional personal charm. He was, in addition, a very sound doctor, well informed, practical and conscientious. But it was the command of a medical unit on active service which gave his particular qualities their opportunity and turned them to account in the service of his country and generation. His happy understanding disposition enabled him to discharge the functions of Commanding Officer of a Field Ambulance as few do and, while maintaining his unit at the highest pitch of efficiency, he contrived to make the lot of everyone fortunate enough to serve under him as pleasant as circumstances allowed. His type is only too rare and such as he can ill be spared.—C. A. de C."

RENNIE.—In India, on July 4, 1943, Colonel William Renton Rennie, M.C. Born Sept. 20, 1884, he took the M.B. Aberdeen, in 1908, and entered the R.A.M.C. Jan. 30, 1909. Promoted Captain July 30, 1912, Major Jan. 30, 1921, Lieutenant-Colonel May 1, 1934, and Colonel Oct. 23, 1937, he retired Sept. 20, 1941. He was appointed honorary surgeon to the Viceroy of India, Aug. 27, 1939. He rejoined Nov. 4, 1941, and was still so serving at the time of his death. In the latter part of the Great War he served in Mesopotamia, receiving the British War and Victory Medals. He was awarded the M.C. for conspicuous gallantry and devotion to duty near Huwaisah on Oct. 28, 1918. During the withdrawal of the regiment (7th Hussars) he stayed behind to tend the wounded under heavy fire. He finally had to withdraw himself, and after mounting noticed a corporal, who had lost his horse, about to be overtaken by the advancing enemy cavalry. He immediately returned and taking the corporal up behind him, rejoined the regiment. His fine action saved this non-commissioned officer from capture.

BYRNE.—Suddenly, in Cairo, on July 10, 1943, Captain Austin William Byrne, M.B., D.P.H., R.A.M.C., Retired. Born Oct. 21, 1880, he took the M.B.

Liverpool, in 1906, and the D.P.H. Manchester, in 1911. He entered the R.A.M.C. Aug. 1, 1908, and was promoted Captain Feb. 1, 1912. He retired on account of ill-health March 21, 1918. For some years subsequently he was expert in Public Health to the Egyptian Government and examined in Public Health, Tropical Medicine and Tropical Hygiene in the Medical School of the Egyptian University. He served in India during the Great War of 1914-1918, being brought to notice for valuable services rendered in connexion with the war. List published Sept. 21, 1918. During the present war he was liaison officer between the Egyptian Government Medical Service, the Royal Navy, Army, R.A.F., and Allied Forces in Egypt. He was created C.B.E. ("London Gazette," Sept. 11, 1942) for his co-operation with the Medical Services of the British Army in Egypt, being particularly helpful in co-ordinating the services of the Egyptian Government Hospitals in connexion with facilities for the treatment of Prisoners of War, which, without his help, would have been an insurmountable problem.

In out of the way places where British and Allied troops were employed or in transit and where no British medical facilities existed his help has made it possible to provide adequate treatment and attention. In all medical matters he devoted much time and hard work to the welfare and health of the British troops in Egypt.

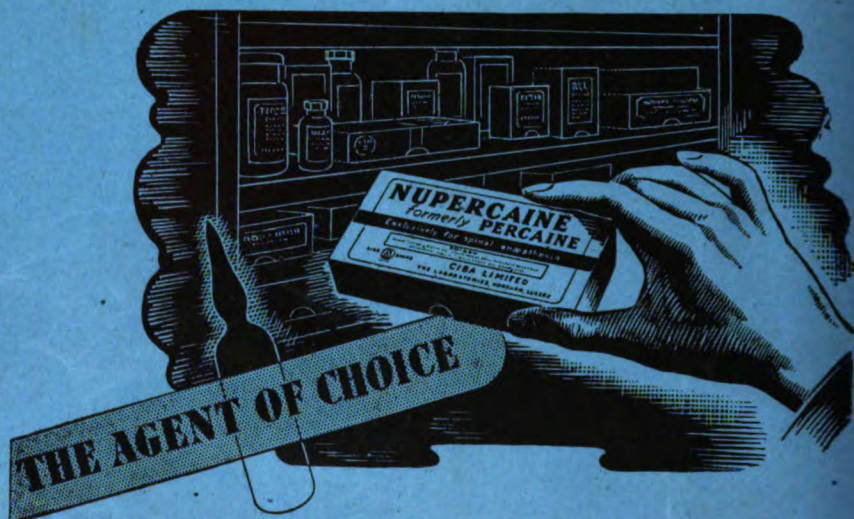
VAVASOUR-LANE.—At 15, Earls Court Gardens, S.W.5, on July 18, 1943, Lieutenant-Colonel Alfred Vavasour-Lane, R.A.M.C., Retired. Born in Wazirabad, April 24, 1854, he took the L.R.C.P.I., in 1877, and the L.R.C.S.I., in 1878 and was commissioned Surgeon July 30, 1881. Promoted Surgeon Major July 30, 1893, and Lieutenant-Colonel R.A.M.C. July 30, 1901, he retired Sept. 15, 1906. He served in Egypt in 1882, receiving the Medal and Bronze Star. In the Sudan in 1884 he took part in the battles of el Teb and Tamai, being awarded two Clasps to the Medal. He was brought to notice for valuable services rendered in connexion with the Great War in the list published February 24, 1917.



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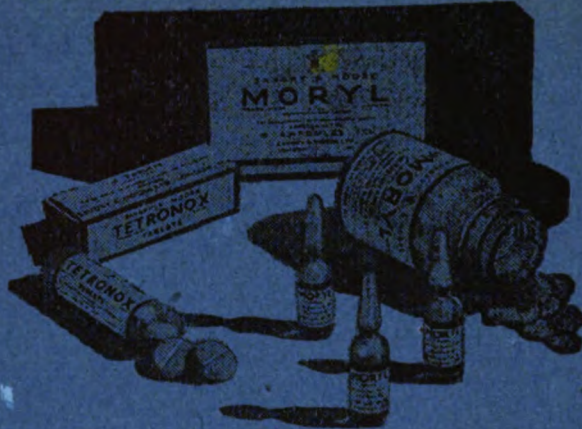
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Journal of the Royal Army Medical Corps.

Original Communications.

A CASE OF INTRACRANIAL AEROCŒLE WITH EXTENSION TO THE LATERAL CEREBRAL VENTRICLE.

BY MAJOR J. A. C. FLEMING,

*Royal Army Medical Corps,
Specialist in Radiology.*

WITH CLINICAL AND PATHOLOGICAL NOTES BY

LIEUTENANT-COLONEL I. G. W. HILL AND MAJOR R. WALMSLEY,

Royal Army Medical Corps.

Royal Army Medical Corps.

CASES of intracranial aerocœle or pneumocœle diagnosed during life do not occur commonly in clinical practice and certain features of the case described, in addition to the infrequency of the condition, appear to us to warrant its publication.

Case History.—Officer (aged 43 years). Little information is available regarding the original injury and the patient's progress during the three months preceding his admission to this hospital. During the Greek campaign in April, 1941, a parachute landmine exploded a short distance in front of the truck in which he was riding. He sustained a fractured skull and was evacuated to a hospital in Egypt where an operation was performed. His progress was such that he was discharged to a Convalescent Depot on July 3, 1941, with a recommendation for 10 days' rehabilitation before return to duty. While at the Convalescent Depot he complained of general debility, of headache and of loss of taste and smell. His discharge was accordingly delayed. His condition appeared to worsen as time went on so that by July 22 he was suffering from severe headaches and was noted to suffer from occasional lapses of memory. It was proposed to send him back to the hospital from which he had come but a rapid mental and physical deterioration led to his admission to this hospital as an emergency on July 23. The provisional diagnosis was of a functional ("NYDN") condition.

On admission he was disorientated in time and place, restless and inclined to wander aimlessly about the ward. He did not complain of headache at this time. Physical examination revealed little: a linear vertical scar on the forehead, some 4 inches long; some weakness of the orbicularis oculi; a doubtful left extensor plantar reflex; scattered rales in the chest. He was examined by the Specialist in Psychiatry (Major J. J. M. Jacobs, R.A.M.C.) who reported that the mental changes were due to an organic lesion and not of functional type.

The day after admission (July 24, 1941) he developed sharp pyrexia (101.8° F.), without localizing signs and without leucocytosis (w.b.c. = 8,700 per c.mm.). No malarial parasites were found in blood films.

July 25: Fever and disorientation persisted. Patient very restless, constantly attempting to get out of bed, and incontinent.

By the evening of that day, the patient presented the clinical picture of a meningitis, with extreme restlessness and irritability, stiffness of neck muscles and bilateral Kernig's sign. No focal signs were found on examination of the central nervous system and both plantar reflexes were definitely flexor.

Lumbar puncture yielded a turbid, xanthochromic fluid, under slightly increased pressure; microscopically there were numerous polymorphs in various stages of degeneration but no bacteria were seen in films and culture of the cerebrospinal fluid was sterile.

During the next two days the clinical picture changed little. Fever and signs of meningitis persisted. Examination of the fundi showed slight blurring of the nasal margins of the discs, considered by the Ophthalmologist (Major I. C. Michaelson, R.A.M.C.) to be physiological. At this time the provisional diagnosis was a possible cerebral abscess as a late sequel to the fracture of the skull three months before.

On July 28, the case was seen by Major P. B. Ascroft, R.A.M.C., and Major M. Kremer, R.A.M.C., of No. 1 Mobile Neurosurgical Unit. On their advice X-ray of the skull, which had been delayed on account of the grave condition of the patient, was carried out. A detailed account of the technical aspects of the examination is given below. The examination revealed a stellate fracture of the frontal bone, involving the frontal sinuses, and the presence of air within the cranial cavity.

In view of the continued signs of meningitis and despite the sterile cerebrospinal fluid and also since signs of basal pneumonia were now appearing, sulphapyridine was administered (1 gramme intravenously, followed by 1 gramme orally every two hours). Next day his mental state appeared rather better, though signs of meningitis persisted and he was still incontinent. The chest condition was, however, worse and his general condition grave. After sinking gradually for forty-eight hours he died on July 31.

Radiological Examination.—The customary technical difficulties associated with carrying out the examination of an unconscious patient were experienced. In addition the amount of head retraction caused by meningeal irritation rendered a true P-A view impossible to obtain. In the films taken certain cranial structures were thrown largely behind the orbits.

The X-ray unit available was of medium power, necessitating an exposure of several seconds. During this period the patient had to be kept as still as possible.

In spite of these drawbacks, however, reasonably good films were obtained which showed the following:—

(1) Two fissures in the frontal bone, starting in the mid-line and passing

downwards and outwards. The left crack apparently passes into the left frontal sinus while the right misses the corresponding frontal sinus but involves the roof of the right orbit.

(2) Immediately behind the frontal sinuses, and apparently localized to this region, a small aerocœle can be seen in the lateral view.

(3) Air is present in at least one lateral ventricle and in the third ventricle. The somewhat unsatisfactory P-A view referred to above renders exact determination of the extent of ventricular involvement difficult.

(4) No communication is apparent between the cerebral ventricles and the aerocœle behind the frontal sinuses.

Post-mortem Examination.—The post-mortem examination was made approximately three hours after death.

The body was that of a well-developed middle-aged man and showed no

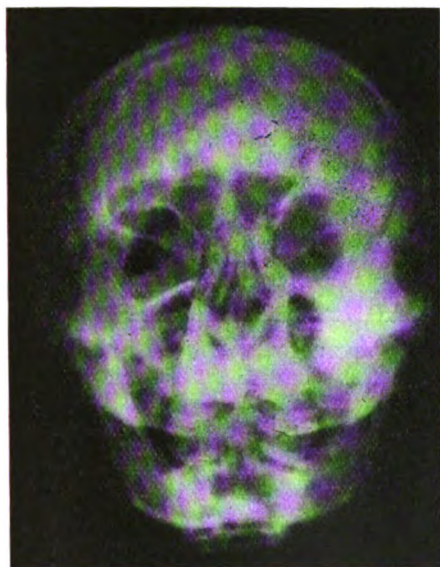


FIG. I.—P-A view of skull showing fracture of frontal bone.

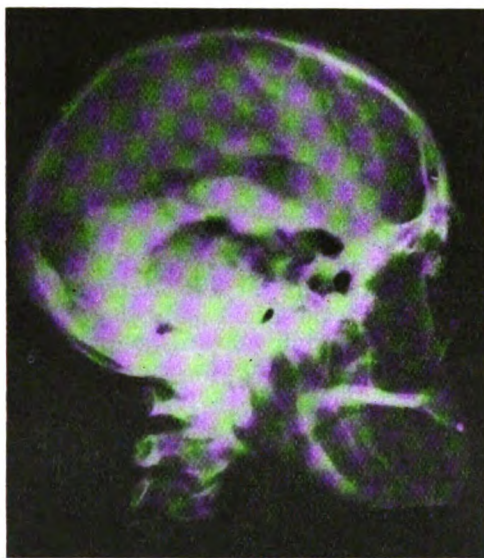


FIG. II.—Lateral view of skull showing aerocœle behind frontal sinuses and air in cerebral ventricles.

evidence of wasting. Rigor mortis was present in the jaw and also, to a less extent, in the limbs. There was a slight degree of post-mortem lividity.

External Examination: Immediately to the right of the mid-line of the brow there was a vertical scar about 10 cm. long; the lower end of the scar was at the root of the nose. The scar was completely healed.

Skull: No obvious fracture of the skull was to be seen after removal of the scalp.

In removing the vault of the skull the outer table and the diploë were sawn through and the inner table was fractured with chisel and hammer. This technique resulted in a part of the posterior wall of the left frontal sinus—which was below the level of the saw cut—being removed along with the skull vault. The line of the ununited fracture of the frontal bone was in the form of a V with each limb of the V being about 2.5 cm. long and the apex at the cribriform plates of the ethmoid. The cribriform plates of the

ethmoid (carrying with them the crista galli) were depressed about 5 mm. below the level of the orbital plates of the frontal bone. The left side of the plate, moreover, was formed of fibrous tissue in which were several foramina, the largest of which had an antero-posterior length of 5 mm. The other foramina were larger than those normally present. No other pathological changes were observed in the skull. The left frontal sinus appeared healthy.

Dura Mater: This membrane was deficient over the foramina in the cribriform plate and a probe passed up through the left nasal cavity passed easily through the largest foramina. No other definite pathological deficiencies of the dura mater were present.

Subarachnoid Space and Arachnoid: A little purulent fluid was present in the basal cisterns around the interpeduncular fossa and optic chiasma but there was no general involvement of the leptomeninges.

Brain: Both frontal lobes were firmly adherent to the fibrous tissue and the dura mater over the region of the cribriform plates. The olfactory bulbs could not be dissected free of the frontal lobes and appeared to be involved in the general pathological change in this region. The other parts of the superficial surface of the brain appeared normal.

The entire brain was divided in the sagittal plane through the corpus callosum, etc. Large bubbles could then be made to appear on the exposed surface of the lateral ventricle by the application of pressure on the surrounding brain. There did not appear to be an enlargement of the ventricles.

The brain, after this preliminary examination, was fixed for four days in 10 per cent formalin. A connexion was then demonstrated between the anterior horn of the left lateral ventricle and the region of the left olfactory bulb where the brain had been cut through during its removal. This connexion passed downwards and slightly forwards from the ventricle, and had a maximum antero-posterior length of 1.7 cm.; the lateral walls bounding the connexion were about 1 mm. apart.

The continuity of the connexion between ventricle and brain surface was verified by the free passage along the channel of coloured fluid injected through the ventricular end.

Microscopic examination of the channel showed its wall was formed of an extremely fine lamina of connective tissue surrounded by a zone of degenerated tissue. Three small vessels appeared to be running along the cleft and these, as well as the vessels lying in the adjacent tissues, showed a well-marked perivascular infiltration of round cells.

DISCUSSION.

Frequency.—The presence of air within the cranial cavity as a sequel to fracture of the skull is a well-recognized though rather rare complication of such injuries. Coleman [1] recorded four cases in a series of 940 head-injury cases of which 87 had basal fractures of the skull. Cases are also recorded by Cairns [2] and by Eden [3] and the condition is described in standard textbooks of surgery (e.g. Christopher [4]).

Location.—The location of the air within the skull varies from case to case. In some, the air lies in the subarachnoid space (Coleman [1]; Cairns [2]); in others it is pocketed in the substance of the frontal lobes (Coleman [1]; Christopher [4]); and in some cases air has been described in the lateral cerebral ventricle (Coleman [1]). A combination of these

locations may occur as in the case here described where a subarachnoid collection and air in the ventricular system co-existed.

Portal of Entry.—In such cases air may enter the skull through a fracture involving an external surface where this is associated with an underlying dural tear. Fractures of the cribriform plate of the ethmoid and those involving the inner wall of an accessory sinus (usually frontal) have been present in the majority of the cases described in the references above. The mechanism of the entry of the air in the skull is debatable. It is held by some that air is forced through the dural rent from the sinus when a rise of pressure in the cavity is produced by sneezing or coughing. Ascroft [5] believes that a simple replacement of cerebrospinal fluid by air may occur. From the nature of the lesion, leakage of cerebrospinal fluid is possible and, in practice, cerebrospinal rhinorrhœa is a frequent clinical feature of these cases (Coleman [1]; Cairns [2]; Eden [3]).

In the case here described the presence of air in the subarachnoid space and ventricular cavities was demonstrated radiographically; fractures of the frontal bone were also seen to be present. The post-mortem examination revealed, in addition, traumatic lesions in the cribriform plate of the ethmoid bone, deficiencies in the overlying dura mater and a pathological connection between these deficiencies and the anterior horn of the left lateral ventricle. A small tear in the dura mater was observed at post-mortem over the fractures in the frontal bone but it was not possible to state with certainty whether or not this was produced during the process of removal of the brain. The loss of the sense of smell which was noted about one month before death is in keeping with the pathological picture found around the olfactory bulbs at post-mortem. The reactive and degenerative processes around the traumatic cleft in the left frontal lobe also denoted a lesion of some standing.

The portal of entry of air into both subarachnoid space and ventricular system seems therefore in this case to be well established. The direct communication between the external nares and the ventricular cavity affords a route of air entrance independent of any foramina in the roof of the fourth ventricle—foramina whose presence has been denied.

Latent Period.—All writers are agreed that there may be a considerable latent period between the occurrence of fracture and the onset of symptoms of the clinical diagnosis of aerocœle. In the case described it will be noted that some three months elapsed between the trauma and the recurrence of unfavourable symptoms. It will be recalled that on his discharge from hospital—some eight weeks after the injury—the patient's condition was such that he was expected to be fit for duty in fourteen days' time.

Radiological Aspects.—The diagnosis of aerocœle and its localization are only possible radiographically. In the rare cases where air is demonstrated within the skull, valuable aid may be afforded to the surgeon in his

decision whether or not to operate on a case of persistent cerebrospinal rhinorrhœa and in localizing the precise area requiring repair.

The chief point of practical importance in the radiological examination lies in the detection of an aerocœle. This, if small and if not accompanied by ventricular involvement, may well be overlooked. It is emphasized that such a small aerocœle may well be mistaken for a normal skull marking. Radiologists would be greatly assisted by having their attention drawn to the possibility of such a condition when cases of this nature are sent for investigation.

Psychological Symptoms.—In the case described, puzzling psychotic symptoms were an early and prominent feature of the terminal phase, symptoms which in fact led to the case being referred to us as one of functional disorder. Mental deterioration has also been described in one case by Eden [3]. Apart from the psychological symptoms, the clinical picture in our case was confused and the diagnosis was reached only after X-ray demonstration of the condition. It is suggested that the possibility of aerocœle be kept in mind when dealing with similar cases.

SUMMARY.

A case of traumatic intracranial aerocœle with extension to the cerebral ventricles is described, together with radiological and post-mortem findings.

The importance of radiological examination in cases showing late neurological and psychotic symptoms following head injuries is mentioned.

ACKNOWLEDGMENTS.

Our thanks are due to Colonel A. T. B. Dickson for permission to submit this case for publication.

Major P. B. Ascroft for his helpful observation on the type of case described.

The Library of the Hebrew University, Jerusalem, for assistance in providing literature on this subject.

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DESERT SORE: A PRELIMINARY STUDY.

BY MAJOR F. RAY BETTLEY, M.D., M.R.C.P.

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DESERT sores are painfully familiar to all medical officers who have been stationed with units of the Army in the Western Desert and to most medical officers in the Middle East. Their importance is in the first place due not so much to the severity of the average case as to the great number of cases which arise.

The following facts regarding their incidence have been elicited from patients and from medical officers who have been in the Western Desert. The incidence is mainly seasonal, most cases occurring in the summer months, though a certain number occur at all times of the year. The disease shows an epidemic tendency, i.e. a unit may remain completely free from cases for long periods but, once cases occur in the unit, they usually multiply and the disease remains endemic. Although the summer is the time of greatest incidence clinical sunburn does not seem to be a factor in causation. Length of stay in the desert is very variable, some cases occurring within a week of arrival there while other men remain free for very many months. In the individual case a history of other cases occurring in the same unit is very usual and the presence of septic cuts and scratches on the arms is fairly common.

Treatment in the desert is usually rather unsatisfactory; sometimes this is due to the chronicity of individual lesions but more often it is because fresh sores are constantly breaking out although healing is not unduly delayed. Almost every regimental medical officer has his own favourite treatment.

The present survey is of cases arriving from the Western Desert at the skin department of a General Hospital in July, 1942. Only white (European) men were included.

Clinical Features.—Desert sores occur principally on the dorsal aspects of the hands and forearms and on the elbows. The knees, volar aspects of the forearms and other parts are less commonly affected and lesions on the trunk are rare.

Sores usually occur spontaneously but occasionally a typical sore results from a scratch or graze or on the site of an insect-bite. They are usually multiple.

The early lesion is a flaccid intra-epidermal vesicle or bulla 2 to 5 mm. across containing thin sero-pus and surrounded by a narrow margin of erythema. It may be follicular but is by no means always so.

Swelling or œdema of the dermis at this stage is imperceptible and there

is little or no pain or itching. Within a day or two the lesion has grown to its full size of 1 to 3 cm. in diameter and is roughly circular in outline. Later bullæ contain a somewhat thicker pus which may be blood-stained. By this time however the bulla has usually ruptured in the centre, leaving a red eroded surface the peripheral edges of which are still covered by the roof of the bulla. The result is that outside the actual eroded surface is a circular margin in which the superficial layers of the epidermis are undermined and can easily be detached. Pus tends to form small pockets beneath this undermined edge. In a few days however this margin of stripped-up epidermis is shed and the sore is covered with a yellow crust with thin sero-pus beneath. The sore is very superficial and the floor not sunken beneath the level of the surrounding skin; there is no true ulceration and induration and œdema in the dermis beneath is slight. In conditions of cleanliness and with weak antiseptic dressings the epidermis dries and reforms completely in seven to ten days; there is no fibrous scar and hair follicles are normal. The hair at the site is usually shed but forms again as soon as the sore is healed. Sometimes the hair is not even shed but sticks up through the eroded sore.

Clinical folliculitis is not at all common. Regional adenopathy is not unusual and more severe cases often show low pyrexia (99° to 100° F.) with frontal headache and slight malaise.

True ulceration of the skin and ecthyma may occur, particularly on the legs, but are not usual and should be regarded as a complication. When they occur the clinical picture is, of course, entirely altered. No sequelæ have been observed in early uncomplicated cases. Manson-Bahr (1940) (1) in discussing desert sores emphasizes the presence of pain, chronic ulceration and neuritic sequelæ. These features are so exceptional in the cases observed in the Western Desert that it must be concluded that the condition described by him under this name is probably not the same as that now under consideration. The lesions we have seen resemble exactly in type and course those of *impetigo contagiosa* of the face with the sole exception that the bullæ tend to grow to a larger size and, after rupture, to leave behind a conspicuous annular rim. These differences are of course attributable to the greater thickness of the corneous layer of the epidermis of the hands and forearms as compared with that of the face.

In view of this close clinical resemblance an inquiry was made into the relation between the incidence of the two conditions.

Clinical Study.—A series of 100 cases was recorded (Series I). This series consisted of 100 consecutive cases who were sent to hospital from the desert on account of desert sores or of facial *impetigo contagiosa* or of both. As a control, a second series was recorded (Series II) of 100 consecutive cases who were sent to the Skin and Venereal Diseases Department for other conditions. All the men in this series had been in the Western Desert for at least one month prior to examination.

Series II.—These men complained of the following conditions:—

Venereal diseases	42 cases
Scabies or pediculosis	21 cases
Other skin diseases	37 cases

In this series the incidence of desert sores and impetigo was:—

Desert sores	13 per cent
Impetigo	1 per cent
Desert sore and impetigo	5 per cent
Free from desert sores and impetigo	81 per cent

Of the 81 who were free from active lesions 20 gave a history of one or other condition since living in the desert.

As none of these men were sent because they had sores, but for other diseases, these figures give some indication of the frequency of desert sores in the desert Army as a whole.

Further analysis of this series showed no significant frequency of desert sore in men suffering from venereal diseases or animal parasitic infestation having regard to the numbers involved.

Series I.—Of the 100 cases comprising this series the actual complaints for which they were sent to hospital were:—

Facial impetigo	65
Desert sore	30
Desert sore and impetigo	5

Sixty-five Cases of Facial Impetigo.—Of these patients, 48 (74 per cent) were found to have desert sore, of which no complaint was actually being made. In 23 of these cases desert sore had preceded the onset of *impetigo* while in 25 *impetigo* had come first.

Thirty Cases of Desert Sore.—Eighteen of these patients (60 per cent) were found to have *impetigo* of the face and of these four had started as *impetigo*. In the five cases in which *impetigo* and desert sore were both complained of, four of these had started as *impetigo*. Thus, out of 100 patients sent for one or other condition, altogether 71 were found in fact to be suffering from both. From the findings in Series II it is evident that many cases of desert sore are not sent to hospital on account of it. This presumably explains the relatively small number of cases in Series I who were sent for this alone. It would explain, too, why few cases starting as *impetigo* are eventually sent to hospital on account of desert sore while many more who start as desert sore are sent to hospital only after *impetigo* has developed.

The close clinical association between facial *impetigo* and desert sore, coupled with their clinical similarity, points very strongly to the identity of the two conditions.

Bacteriology.—A few bacteriological investigations were carried out. Direct smears were made from the fluid of early bullæ of *impetigo* and of desert sores and stained by Gram's method. In either case the findings were closely similar. Polymorphonuclear cells were present, together with Gram-positive cocci, often showing diplococcal grouping and sometimes

apparently intra-cellular; this is a common finding in smears from *impetigo* occurring in England. Cultures were made from fifteen cases all of which had both desert sore and *impetigo*. Early unruptured bullæ were examined in most cases but some older open lesions were cultured as well. The results are shown in the accompanying table. The only organisms grown

Case	TABLE											
	DESERT SORE.						IMPETIGO					
	Early			Late			Early			Late		
	Staph.	Strep.	Diph.	Staph.	Strep.	Diph.	Staph.	Strep.	Diph.	Staph.	Strep.	Diph.
1			+									
2	++	+										
3							+	+				
4	++	+						+	+			
5		++		+	++					+	++	
6	+	+									+	
7	+						+					
8	+									+	+	
9				+			+					
10				+	+					+	+	
11				+						+		
12				±	+		+				+	
13	+		±		+							
				Viridans								
14	+											
15		+										+

were *Staphylococcus aureus* (coagulase positive), *Streptococcus hemolyticus* and diphtheroids which are recorded. In Case 6 *Staphylococcus albus* (coagulase negative) also appeared and has not been recorded in the table.

This small number of cases does not admit of any conclusion being drawn. As far as it goes it seems compatible with the conception that facial *impetigo* and desert sore are identical conditions.

Manson-Bahr (1940) (2) under the heading of *pemphigus contagiosus* (*pyosis mansonii*) describes a condition resembling these desert sores in many respects. He also mentions the presence of diplococci in pus from the blister fluid. Although he does not include Egypt in the list of countries where it occurs it is interesting to note the similarity between *pyosis mansonii* and the desert sore of the Western Desert.

Causative Factors.—It will perhaps be profitable to consider what particular factors might lead to the development of impetiginous desert sores and first we may consider the conditions which favour the development of *impetigo* in temperate climates.

(1) Physical contact with pus from a case either by direct contact between persons or by fomites is important.

(2) The thinness of the corneous layer of the skin of the face probably makes entry of organisms more likely, perhaps through the intact skin.

(3) Small cuts and scratches often provide a portal of entry for the organism.

In the Western Desert all these factors are probably at work. In

the communal life which soldiers tend to lead the passage of infection by contact and fomites is made more likely. The constant drying effect of sand, dust and wind on the skin of the exposed parts probably leads to damage and increased permeability of the epidermis though it is not actually thinned. Small untreated cuts and scratches are very common on the hands and forearms.

Various other factors have been suggested but are thought to be of less importance. Vitamin and other dietary deficiencies and shortage of drinking water have been blamed. This is difficult to substantiate since sores occurred commonly in pre-war times when food and water were abundant. Furthermore, clinical evidence of known vitamin deficiency is not at all common in the Middle East Army. In the Western Desert the incidence of sores does not appear to vary with conditions of food or water. It does not seem likely that desert sore is carried by a biting insect. Blood sucking insects bite through the epidermis to reach the vessels of the dermis and the reaction they cause is a *dermal* one, whereas the primary lesion of the sore is an *intra-epidermal* one. Although many soldiers with desert sore have been bitten by insects of one kind or another they do not often describe the sore as arising on the site of a bite nor does the clinical appearance of the lesion show the œdema which usually follows such a bite. The sites of such bites are, however, scratched and excoriated by the patient and, in suitable circumstances, these scratches may no doubt be infected afterwards and give rise to a sore. In such an event the distribution of lesions in most cases would suggest a blood-sucking fly.

The ordinary non-biting fly may also play a part by carrying organisms from a sufferer to the intact or excoriated skin of an uninfected person.

Treatment.—In the treatment of *impetigo* it has not been found necessary to alter the routine used in civilian practice (Bettley, 1940). Desert sores have been treated in hospital with dressings of eusol; most cases heal in seven to ten days. In other cases 3 per cent sulphanilamide in vaseline has been used with equal success. Fresh sores often continue to appear for a few days after admission to hospital but, with careful dressings, heal quickly. No dietary or other internal treatment has usually been given.

Prophylaxis.—The comments made above concerning causative factors immediately suggest possible means of prophylaxis. Avoidance of cuts and scratches and their prompt treatment when acquired, prevention of excessive drying of the skin, extermination of flies and biting insects, are ideals difficult of realization. Localized epidemics of *impetigo contagiosa* are not infrequent in England and are usually best dealt with by isolation of cases. This method suggests itself in dealing with desert sores. Isolation of the lesion itself may be attempted by the use of occlusive dressings such as Elastoplast. This should be applied so as to cover the sore and a margin of 1 cm. of normal skin around and left in place for seven to ten days. In facial *impetigo* this constitutes a fairly satisfactory

treatment and often appears to check contagion. Failing this, the patient should be isolated. This will seldom be possible within the unit unless the man is evacuated. By the prompt evacuation of a few early and apparently trivial cases from a unit the occurrence of many more might possibly be avoided. In units where large numbers are already affected this would represent a serious wastage but is probably the only alternative to the continual sporadic occurrence of the disease. It must be emphasized that the above remarks apply to the sore occurring in the Western Desert at one particular time. While it constitutes a definite and clear-cut entity, it seems likely that in other regions or at other times different conditions are given this name, and these notes should not, therefore, be taken as necessarily applying to them.

In the Western Desert the term "desert sore" has been loosely applied to a great variety of ulcerative and inflammatory conditions but the clinical picture described above is so characteristic that difficulty in diagnosis need seldom arise if its features are borne in mind.

CONCLUSIONS AND SUMMARY.

(1) The clinical features of the desert sore of the Western Desert are described.

(2) This desert sore is closely associated with *impetigo contagiosa* and is probably a form of bullous *impetigo* analogous to *pemphigus contagiosus*.

(3) Possible ætiological factors are discussed and the means of combating them are suggested.

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MOBILE BLACKWATER FEVER TREATMENT TEAMS.

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THE employment of European troops for considerable periods in hyper-endemic malarial zones where *Plasmodium falciparum* is the prevailing parasite has naturally been followed by the occurrence of blackwater fever. When the total number of troops at risk is considered, however, the actual incidence of blackwater fever has been low—an average of approximately 60 cases a year for the past three years. Nevertheless, treatment of blackwater fever under military conditions is by no means easy for, if the mortality is to be kept low, it is essential to ensure the patient medical treatment and skilled nursing at an early stage of the disease together with absolute rest. In practice the patient may be stationed many miles from the nearest medical establishment while to transport him over dusty and often bumpy laterite roads in a hot and humid tropical climate is seriously to prejudice his chances of recovery.

Since it is undesirable to take the patient to the medical officer the opposite course must obviously be adopted and the medical officer and nursing staff taken to the patient. The provision of mobile blackwater fever treatment teams was first suggested in February, 1942, by Major T. R. Hill, R.A.M.C., when medical specialist to a West African hospital. The suggestion was immediately adopted by the D.D.M.S. and two months later blackwater fever teams were available in all General Hospitals in the West African Command and in the majority of Casualty Clearing Stations.

After fifteen months of full functioning during which each team has on the average been out in the field three times it seems desirable to place on record a brief account of the equipment necessary for such teams in order that, if necessity arises, similar teams may be used in other areas.

The personnel of each team has consisted of one Medical Officer, one Nursing Officer and two Nursing Orderlies. Where possible, a second Nursing Officer has been included so that both a Sister and an orderly may be on duty day and night. When Casualty Clearing Stations have provided the team Nursing Officers have, of course, not been available and their place has been taken by one or two additional Nursing Orderlies.

Changes in the personnel of the team should be avoided as much as possible and before going out each team should have had practice in nursing cases of blackwater fever in hospital. Preliminary training as a team is especially essential if methods of direct transfusion are to be attempted in the field. The medical officer in charge of the team should

treatment and often appears to check contagion. Failing this, the patient should be isolated. This will seldom be possible within the unit unless the man is evacuated. By the prompt evacuation of a few early and apparently trivial cases from a unit the occurrence of many more might possibly be avoided. In units where large numbers are already affected this would represent a serious wastage but is probably the only alternative to the continual sporadic occurrence of the disease. It must be emphasized that the above remarks apply to the sore occurring in the Western Desert at one particular time. While it constitutes a definite and clear-cut entity, it seems likely that in other regions or at other times different conditions are given this name, and these notes should not, therefore, be taken as necessarily applying to them.

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Idem. (2) *Ibid.*, p. 683.
BETLEY, F. R. (1940). *Med. Press & Circ.*, 1940, 73.

be capable not only of carrying out blood transfusions but of simple laboratory techniques such as blood grouping, cross-matching of the patient's and donor's red blood corpuscles and sera, red blood cell counts, hæmoglobin percentage determinations and demonstration of malaria parasites in blood films.

The team should be ready to leave the hospital within an hour of receiving a summons. Each member of the team should be provided with a suit case and should also be furnished with a light camp bed, camp equipment and a mosquito net. The matter of weight is of importance when, as has happened on more than one occasion in this Command, the team has gone by air. When transport is by car or motor launch the matter of weight is of less urgency and if feasible it is advisable for the



FIG. 1.—Gidda or round hut in which a patient with blackwater fever was successfully nursed.

team to take with them a hospital bedstead. The nursing of a patient with blackwater fever on a low trestle bed adds greatly to the difficulties of the nurses and the discomfort of the patient, more especially when the "bedroom" is a round mud hut of the type illustrated in fig. 1. As such small round huts become very hot during the day, and often at night, it is advisable to include in the equipment a simple punkah unless of course the unit's lines are so sophisticated as to be equipped with electric light, when an electric fan is of great help in cooling the air in the hut.

The list of equipment which has been found essential for mobile blackwater fever teams is given in the Appendix and requires little comment. Sterile solutions must be prepared in the laboratory of the hospital. Sodium bicarbonate solutions should be freshly made up at least every ten days

and must be sterilized by filtration and not by heating. The team, their personal belongings and the equipment can easily be carried by an ambulance.

As much of the equipment as possible should be kept ready packed and for this purpose light but strong travelling panniers or boxes should be constructed with suitable holes for bottles and other equipment. For purposes of air transport it is advisable to know beforehand the weight of the equipment and also the weights of the members of the team. The main equipment is illustrated in fig. 2.

With the use of transfusion apparatus under bush conditions it has been found that while the Army pattern taking set is excellent the giving set is unsatisfactory so far as blood transfusions are concerned; in black-

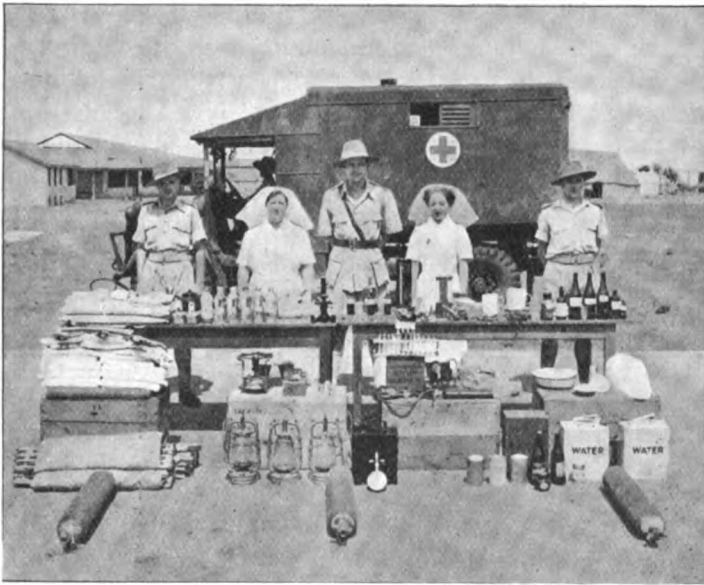


FIG. 2.—General equipment of blackwater fever treatment team.

water fever continuous blood transfusions are usually called for, the transfusions being given as slowly as possible. The Marriot-Kekwick apparatus has therefore been substituted and has been found to work well. Under bush conditions the transfusion of packed red cells is usually impracticable.

As on more than one occasion patients have developed blackwater fever at a time when it was impossible for a medical officer, much less a blackwater fever team, to reach them for some hours, instructions have been issued in this Command for the first aid treatment of blackwater fever.

(1) The patient should not be allowed to walk after passage of a blackwater urine but must be placed on a stretcher and treated as a stretcher case.

(2) He must be put to bed at once and kept absolutely at rest. He must not be allowed to get out of bed to visit the latrine and must not even raise his head to take drinks.

(3) A message should be sent at once by the quickest means available to the medical officer responsible and also to the Casualty Clearing Station or General Hospital responsible for providing a blackwater fever team.

(4) Alkaline drinks should immediately be given by mouth in the form of sodium bicarbonate, one teaspoonful to the pint. As much of this should be given at hourly intervals as the patient can swallow. If soda water is available the sodium bicarbonate should be dissolved in it as absorption is more rapid.

(5) In addition drinks of weak tea with plenty of sugar or sugar dissolved in cold water should be given by mouth. No solid food must be taken.

(6) All urine passed should be kept until a medical officer has seen it.

(7) If the patient is very restless or apprehensive, or vomiting is severe, not more than one tablet of morphine tartrate ($\frac{1}{4}$ grain), to be found in the medical companion and in some boxes, first aid, should be placed under the patient's tongue. The administration of morphia should be recorded in writing with the time and the signature of the person who gave the morphia.

(8) These instructions must be displayed in all M.I. Rooms and should be brought to the notice of all European personnel on detached duty or employed on out stations.

While it is recognized that the provision of a number of mobile blackwater fever teams is dependent on the presence in an area of an adequate number of medical officers, sisters and nursing orderlies, it is felt that a modification of these mobile teams might be adopted by Civilian Medical Services in hyperendemic malarial countries. One or two teams might well be organized in association with the larger central hospitals in each Colony. With the increase in airfields and in the rapidity of motor transport such teams could reach any point within a few hours.

In the West African Command the provision of mobile treatment teams has undoubtedly been an important factor in reducing the mortality from blackwater fever.

My thanks are due to Major D. L. H. Goddard, R.A.M.C., for assistance in obtaining the photographs and to Lieutenant-Colonel G. M. Comas, R.A.M.C., and Major R. M. Morrison, R.A.M.C., for checking the list of equipment.

APPENDIX.

BLACKWATER FEVER EQUIPMENT

Acetone	...	...	...	...	...	...	oz.	2
Acid, Hydrochlor., N/10	...	...	...	...	...	...	oz.	2
Aq. dist. (sterile)	...	...	...	...	...	...	oz.	4
Aq. dist. (sterile), 400 c.c.	...	...	...	...	...	...	botts.	4
Benedict's soln. qual.	...	...	...	...	...	...	oz.	4
Dextrose, A. R.	...	...	...	...	...	...	kg.	1

Liq. Adrenal hydrochlor.	...	...	...	...	oz.	1
Liq. Iod. Mit.	...	...	...	...	oz.	2
Mist. A.P.C.	...	...	...	...	pts.	$\frac{1}{2}$
Mist. Bromo-Chloral	...	...	...	...	pts.	$\frac{1}{2}$
Mist. Pot. (or Sod.) Cit. (grs. LX. to oz. 1)	...	...	...	...	pts.	1
Mist. Sod. Bicarb. (grs. XXX to oz. 1)	...	...	...	...	pts.	1
Ol. Terebinth	...	...	...	...	oz.	4
Ac. Acetic 33 per cent	...	...	...	...	botts.	1
Paraff. Moll. Flav.	...	...	...	...	tubes	1
Plasticine	...	...	...	...	lb.	$\frac{1}{2}$
Procaïn et Adrenal in 2 per cent or 3 per cent	...	...	...	...	botts.	1
Quinine dihydrochlor., grs. 10 in 5 c.c. amps	...	...	...	...	ampoules	10
Sap. Moll.	...	...	...	...	oz.	4
Sod. Bicarb.	...	...	...	...	oz.	5
Sod. Bicarb. G 12	...	...	...	...	pkts.	10
Sod. Bicarb. sat. soln.	...	...	...	...	c.c.	50
Sod. Bicarb. 2 per cent (sterile) soln.	...	...	...	...	pts.	1
Sod. cit.	...	...	...	...	oz.	5
Sod. cit. 3·8 per cent (sterile) soln.	...	...	...	...	botts.	2
Sod. Lact. A.R. 3M soln. (sterile)	...	...	...	...	c.c.	50×6
Tabs. Mepacrine hydrochlor. 0·1 grm.	...	...	...	...	...	100
Tabs. Morph. Tart. $\frac{1}{2}$ gr.	...	...	...	...	...	12
Tabs. Quinine Hydrochlor. 4 grs.	...	...	...	...	...	50
Tabs. Sod. Bicarb. 10 grs.	...	...	...	...	...	20
Tabs. Sod. chloride 40 grs.	...	...	...	...	...	12
Tabs. Sod. cit. 5 grs.	...	...	...	...	...	20
Tabs. Lysol $\frac{1}{2}$ drachm	...	...	...	...	tins	1
Bottles, plain	...	...	...	...	...	4
Plasma, dried	...	...	...	...	botts.	4
Serum, blood grouping, type A	...	...	...	...	c.c.	1
Serum, blood grouping, type B	...	...	...	...	c.c.	1
Gallipots, nests of 4	...	...	...	...	...	1
Measures, glass, grad. 2 oz.	...	...	...	...	...	1
Bandages, elastic, adhesive, 1 inch	...	...	...	...	...	1
Bandages, flannelette, 3 inch, 4 inch or 6 inch	...	...	...	...	...	1
Bandages, L.W.O.W., 2 inch	...	...	...	...	...	8
Bandages, L.W.O.W., 3 inch	...	...	...	...	...	10
Jaconet	...	...	...	...	yds.	2
Lint, C. A.	...	...	...	...	lb.	2
Plaster, adhesive, 1 inch	...	...	...	...	spools	1
Tow, or wadding cellulose	...	...	...	...	lb.	1
Wool, C. A.	...	...	...	...	lb.	2
Sheeting, waterproof, I.R.	...	...	...	...	yds.	2
App. for rectal feeding	...	...	...	...	...	1
App. oxygen, B.L.B. patt., complete	...	...	...	...	...	1
App. Transfusion and infusion, a B.S.D. patt.	...	...	...	...	...	2
Sets, blood taking, complete for	...	...	...	...	...	6
Sets, blood or plasma giving, complete for	...	...	...	...	...	1
App. for continuous drip transfusion, Marriot-Kekwick, comp.	...	...	...	...	...	4
Basins, dressing, E.I.	...	...	...	...	...	4
Books, litmus, red and blue	...	...	...	...	...	2
Bowls, E.I.	...	...	...	...	...	1
Brushes, nail, ward	...	...	...	...	...	4
Dishes, Kidney, E.I., 4 inch	...	...	...	...	...	6
Catgut, sterile, plain, fine	...	...	...	...	tubes	2
Catheters, I.R., Jacques, size 8	...	...	...	...	...	8
Cylinders, oxygen, full, 40 cu. feet	...	...	...	...	...	1
Enemas, I.R., complete	...	...	...	...	...	1
Jugs, graduated, 1 pint	...	...	...	...	...	1
Jugs, graduated, 2 pint	...	...	...	...	...	1
Needles, surgeons	...	...	...	...	pkts.	1
Pins, safety	...	...	...	...	tins	1
Silkworm, gut, fine	...	...	...	...	hanks	2
Tape, broad, pieces	...	...	...	...	...	2
Thermometers, clinical...	...	...	...	...	...	7
Tubes, dropping, glass with I.R. teats	...	...	...	...	...	2
Tubing, I.R.	...	...	...	...	feet	1
Tubing for flatus	...	...	...	...	...	1

Lancet, blood	...	...	...	...	...	...	...	...	1
Forceps, artery	...	...	...	...	...	...	...	prs.	4
Forceps, dressing	...	...	...	...	...	...	...	prs.	1
Forceps, dissecting	...	...	...	...	...	...	...	prs.	1
Scalpels, in case	...	...	...	...	...	...	...	prs.	1
Scissors, surgical	...	...	...	...	...	...	...	prs.	1
Sphygmomanometer	...	...	...	...	...	...	...	...	1
Sterilizers, fish, kettle, complete	...	...	...	...	...	...	...	...	1
Syringes, hypo., 2 c.c., complete in case with needles,	3	...	...	...	...	...	...	...	1
Syringes, serum, 20 c.c., complete in case with needles,	2	...	...	...	...	...	...	...	1
Clips, screw	...	...	...	...	...	...	...	...	3
Hæmacytometer, complete	...	...	...	...	...	...	...	...	1
Measures, glass, grad. cyl. 10 c.c. and 500 c.c.	...	...	...	...	...	...	...	...	1
Microscope in case	...	...	...	...	...	...	...	...	1
Pipettes, grad. 1 c.c.	...	...	...	...	...	...	...	...	1
Slides, microscope	...	...	...	...	...	...	...	...	8
Stands, test tube	...	...	...	...	...	...	...	...	1
Tubes, test	...	...	...	...	...	...	...	...	15
Tubes, Agglutination, Dreyer's	...	...	...	...	...	...	...	...	7
Durham's tubes, with and without sodium citrate	...	...	...	...	...	...	...	...	4
Kerosene	...	...	...	...	...	...	...	galls.	2
Methylated spirit	...	...	...	...	...	...	...	pts.	2
Soap, toilet	...	...	...	...	...	...	...	...	1
Containers, water, 2 gall.	...	...	...	...	...	...	...	...	2
Sponges, bath	...	...	...	...	...	...	...	...	1
Warmers, stomach	...	...	...	...	...	...	...	...	4
Warmers, stomach, covers, for	...	...	...	...	...	...	...	...	4
Beds, camp	...	...	...	...	...	...	...	...	5
Bedstead, folding, Mk. III	...	...	...	...	...	...	...	...	1
Bedstead, folding, mattress spring	...	...	...	...	...	...	...	...	1
Blankets	...	...	...	...	...	...	...	...	4
Cloths, distinctive	...	...	...	...	...	...	...	...	4
Cloths, tea	...	...	...	...	...	...	...	...	2
Curtains, mosquito	...	...	...	...	...	...	...	...	5
Mattresses, hospital	...	...	...	...	...	...	...	...	1
Pillows, feather	...	...	...	...	...	...	...	...	2
Pillows, slips	...	...	...	...	...	...	...	...	4
Sheets, hospital	...	...	...	...	...	...	...	...	4
Towels, hand, huckaback	...	...	...	...	...	...	...	...	2
Towels, terry, cotton, hand	...	...	...	...	...	...	...	...	4
Dishes, soap, enamelled	...	...	...	...	...	...	...	...	2
Feeder, enamelled	...	...	...	...	...	...	...	...	1
Kettles, tea	...	...	...	...	...	...	...	...	1
Mug, drinking (or pannikins)	...	...	...	...	...	...	...	...	2
Pots, tea	...	...	...	...	...	...	...	...	1
Saucepans	...	...	...	...	...	...	...	...	1
Stoves, oil, wickless	...	...	...	...	...	...	...	...	1
Bedpan, E.I.	...	...	...	...	...	...	...	...	1
Urinals, enamelled	...	...	...	...	...	...	...	...	1
Lamps, electric (torch)	...	...	...	...	...	...	...	...	2
Shirts, helpless patients	...	...	...	...	...	...	...	...	?
Army Forms: I. 1237; I. 1220; B. 181.									
Special Blackwater Fever Form.									
Forms for pathological investigations.									
Note paper	...	...	...	...	...	...	...	...	...
Latrine paper	...	...	...	...	...	...	...	...	...
Matches	...	...	...	...	...	...	...	boxes	2
Bovril	...	...	...	...	...	...	...	tins	2
Lemonade	...	...	...	...	...	...	...	botts.	6
Ovaltine	...	...	...	...	...	...	...	tins	2
Sugar	...	...	...	...	...	...	...	lb.	2
Grane fruit or other fruit juice	...	...	...	...	...	...	...	botts.	2
Barley	...	...	...	...	...	...	...	lb.	1
Champagne	...	...	...	...	...	...	...	botts.	2
Milk	...	...	...	...	...	...	...	tins	8
Soda water	botts.	6
Tea	lb.	1
Tin opener	1

ARSENICAL TOXÆMIA: A SELECTION OF CASES.

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IN this paper is described a selection of cases of arsenical toxæmia among soldiers undergoing anti-syphilitic treatment which occurred in the Middle East.

Nearly thirty examples of this kind of toxæmia were treated within the space of a few months in this hospital and ample opportunity was afforded for bedside study but unfortunately laboratory facilities were meagre and only the simplest investigations could be carried out.

The drugs used were neosalvarsan, novostab, and sulphostab. Possibly some of the supply of sulphostab had deteriorated in condition because of exposure to tropical heat during transport from England and through the Middle East. Moreover it was administered by the intravenous route—a method which had been followed for some eighteen months previously without an undue incidence of reactions.

The manifestations of arsenical toxæmia are as protean as the remedies suggested are varied and even contradictory. The fundamental pathology of the condition is not clear although the feature common to all cases is acute capillary damage. In its mildest form this is shown by a dilatation of the surface vessels on the ball of the eye and of the external acoustic meatus, signs which were present in many of the cases described below. At the other extreme is the profuse hæmaturia illustrated in the case of toxic purpura which is included in this series. The severity of the capillary damage can be gauged roughly by a single capillary resistance test.

Two theories of the causation of this capillary toxæmia are commonly upheld. One supposes that arsenic or one of its products exerts a direct action on the capillaries. The other is based on the belief that the action is indirect; that the capillaries suffer as a result of toxic products which have been elaborated by the liver and distributed in the circulation, the hepatic cells being poisoned by arsenic. Early in the series of cases under review, insulin was used to enhance the therapeutic effect of glucose and it seemed to produce an early and striking improvement in the clinical condition of patients to whom it was administered. It was deduced, therefore, as a working hypothesis, that the liver should be the primary object of attention.

Accordingly treatment by intravenous sodium thiosulphate and sulphur by mouth were suspended and emphasis was put upon the three therapeutic agents, glucose, insulin and ascorbic acid.

Case 1.—Pte. T. Purpura hæmorrhagica toxica.

This man had been receiving anti-syphilitic treatment in the clinic regularly for seven months: he had not previously shown any signs of intolerance to arsenic.

31.12.41: Was given 0.6 g. sulphostab i/v.

4.1.42: Patient had been perfectly fit since receiving his injection and had returned to duty but suddenly developed profuse bleeding from the nose and gums. On the next day hæmaturia occurred in addition. He was put in a lorry and, after a journey of four days, arrived at this clinic on 8.1.42.

8.1.42: His condition was dreadful. He was extremely exsanguinated and here and there, over the whole surface of the body, were purple ecchymoses. He was bleeding profusely from the nose, mouth and kidney. The blood picture was: R.B.C. 2,080,000 per c.mm. Hb. unknown. W.B.C 11,450 per c.mm. Polymorphs 68.5 per cent, eosinophils 3.5 per cent, basophils 0.5 per cent, lymphocytes 23.0 per cent, monocytes 4.5 per cent.

The urine seemed to consist of pure blood and a cell count of the fresh unsedimented fluid read—R.B.C. 900,000 cells per c.mm.

It was impossible to carry out a blood platelet count. On auscultation of the heart the only abnormal sign discovered was a marked reduplication of the second pulmonary sound. The blood-pressure read as 130/80 mm. of mercury and the significance of this relatively high reading was not appreciated at the time. Subsequent events suggested that it may have been indicative of an incipient uræmia caused by blocking of the renal tubules by blood.

It is curious that, when palpated abdominally, the patient complained of no tenderness in the renal angles along the lines of the ureters or over the bladder—although discomfort in these areas developed some days later.

There were tiny petechial hæmorrhages on the surface of the eyeballs and subretinal hæmorrhages involving the macular regions of both eyes.

The immediate treatment was that for shock. In addition the patient was plied with glucose, fluids and ascorbic acid by mouth and given injections of horse serum and calcium gluconate.

9.1.42: He was much weaker and continued to lose a great deal of blood from the urinary tract and mouth. His temperature was 101° F. At 1100 hours he was transfused with $\frac{3}{4}$ pint of fresh citrated blood and one pint of glucose saline. He developed a rigor shortly afterwards and his temperature climbed still higher. Hæmorrhage seemed to have increased rather than diminished and his condition grew desperate.

10.1.42: The patient declared that he was feeling stronger but complained of pain in the renal angles and down the line of the ureters. The urine still contained great quantities of blood but without clots. Auscultation of the lungs showed no moist sounds of the bases. A small rectal washout was administered and shortly afterwards the patient vomited a copious quantity of blood but, since he was still bleeding profusely from the nose, this was possibly swallowed blood. Morphia was administered throughout the day but vomiting continued until 2200 hours. He had become too weak to raise his arms from the bed. Nevertheless, as a last

resort, he was given an intravenous drip saline with glucose late at night. He became delirious shortly afterwards.

11.1.42: The patient survived the night and it was a surprise to find that he had rallied somewhat. The amount of blood passed with the urine was much reduced but the gums and nose continued to bleed in spite of all efforts to arrest the hæmorrhage. He began, however, to take fluids by mouth and the vomiting became less severe.

Examination of the heart revealed a systolic murmur which could be heard all over the præcordia with a loud "click-clack" reduplicated second sound at the pulmonary area. The pulse-rate was 130 per minute and fever continued. There were no signs of right-sided cardiac failure.

Blood picture: R.B.C. 900,000 per c.mm. Hb. 15 per cent (Hæmoglobinometer unreliable). W.B.C. 15,000 per c.mm. Polymorphs 81 per cent, lymphocytes 18 per cent, monocytes 1 per cent.

Between 1500 and 1800 hours the patient was given $\frac{3}{4}$ pint of citrated blood and $\frac{1}{2}$ pint of glucose saline by slow intravenous drip. He seemed to improve in his general condition and the pulse became stronger at the wrist but the rate remained 130 per minute as before. The most heartening result of the transfusion was an increase in the urine output with noticeable decrease in the amount of blood contained. Bleeding from the nose had ceased completely. The patient slept well throughout the night and it was hoped that he had safely passed the crisis.

12.1.42: There was distinct colour in the lips and finger nails and the patient was cheerful. A curious feature was his drowsiness—he was continually falling asleep. The blood-pressure was now 90/40 mm. mercury and the R.B.C. count 1,562,000 cells per c.mm. Van den Bergh reaction was negative.

13.1.42: The temperature had fallen to 99.8° F., and the pulse-rate was 116 per minute. The blood urea was returned as 65 mgm. per cent. The patient received his third blood transfusion, $\frac{3}{4}$ pint of citrated blood being given by drip over a period of three hours. There resulted an unbelievable improvement in his condition. The temperature returned to normal.

14.1.42: Patient feeling very much better. The urine was only slightly blood-stained. By nightfall the pulse-rate had returned to 90 per minute.

17.1.42: Total R.B.C. 3,378,000 per c.mm. Hb. 55 per cent. W.B.C. 16,875 per c.mm. Polymorphs 58 per cent, lymphocytes 28 per cent, eosinophils 8 per cent, monocytes 6 per cent.

Convalescence was uneventful until 5.2.42, when the patient complained of dimness of vision. The visual acuity of the right eye was found to be 6/18 and that of the left 6/24. In the left eye a circular clot involved the entire macula and, in the right, the clot was half-moon shaped leaving the upper area of the macula intact. Both clots resolved during the course of the following seven weeks. In the case of the right eye the clot appeared to resolve into three smaller clots which eventually disappeared while, in the case of the left eye, the clot was vascularized before final resolution. The patient returned to duty.

Comment.—(1) A severe case of toxic purpura with massive hæmorrhage, saved by blood transfusion.

(2) The possibility that imminent renal failure and uræmia may have played a part in the pathology of the condition.

(3) The unusual complication of sub-retinal hæmorrhages occurring in the areas of the maculæ.

Case 2.—Flight-Lieutenant G., R.A.F. Severe jaundice following the second injection of arsenic.

This case is described because of its intimate relationship in symptomatology with Case 3 which follows.

The patient was admitted to hospital with a syphilitic chancre on 2.9.41. He was treated under best possible conditions, being confined to bed during the period of his first two injections. He was an apparently healthy young man. Glucose was given prior to each arsenical injection and weight and urine were watched.

6.9.41: Given neosalvarsan (Bayer) 0.3 g. i/v. Patient was not disturbed in the slightest degree by the injection.

9.9.41: Given 0.45 g. neosalvarsan and 0.2 g. bismostab. He exhibited no untoward symptoms and was discharged to out-patients on 10.9.41.

14.9.41: Patient was brought to hospital very ill. He had developed malaise three days after his last injection, followed by extreme nausea, rigors and vomiting.

On examination he displayed swelling of the eyelids and face: the fauces were congested and a white membrane covered both tonsils. The urine contained bile and already an icteric tinge could be made out on the sclera of the eye. On the chest there was a faint scarlatiniform rash. He complained of intense headache and was very restless. His temperature was high and of the remitting type. During the subsequent days jaundice developed but recovery was satisfactory and the patient was discharged from hospital some six weeks later. Initial treatment was on conventional lines and included five ounces of glucose daily but, later, insulin was given in addition to glucose and it was noticed that there followed a quite sudden improvement in the patient's general condition.

On going into his past medical history it was discovered that he had suffered a protracted attack of jaundice some six years previously at a time when he was engaged in work with high explosives.

Comment.—(1) The past attack of jaundice described by the patient may well have been due to subacute necrosis of the liver.

(2) An apparent improvement in the patient's condition when insulin was given in addition to glucose.

Case 3.—Pte. M. Sudden onset of œdema of the face and throat.

15.11.41: The patient was admitted to hospital with a primary syphilitic chancre of the lip. He was a healthy young man and there was no factor in his medical history to suggest that he would prove a bad subject for anti-syphilitic therapy.

Given 0.3 g. neosalvarsan i/v. After this injection the patient remained fit and well.

19.11.41: Given 0.45 g. neosalvarsan i/v. and bismostab 0.2 g. i m. (The drug belonged to the same batch as that used in Case 2. Flight-Lieutenant G. It had been given to many other patients without noticeable toxic effects.) Within twelve hours of this last injection, Private M. began to develop symptoms and signs almost identical with those noticed in the case of Flight-Lieutenant G. The onset was characterized by intense headache followed by sore throat, rigors and fever.

22.11.41: Patient was extremely restless and ordinary sedatives were ineffective in producing sleep at night. His face was swollen and his eyelids were closed by œdema. The temperature was 103° F. In addition

to fluids and alkalis, the patient was given: Glucose—6 ounces during the course of the day; insulin—5 units t.i.d.; ascorbic acid tablets—(25 mgm.) three q.i.d.

24.11.41: Patient fit and well.

Comment.—An acute case of arsenical toxæmia which resolved rapidly under treatment with glucose, insulin and ascorbic acid.

Case 4.—Private W. Acute toxæmia occurring within two hours of an injection of arsenic.

This patient was an apparently healthy man. Examination of the urine and body weight were satisfactory prior to each injection.

24.12.41: Given 0.3 g. sulphostab i/v.

31.12.41: Given 0.3 g. sulphostab i/v.

4.1.42: Given 0.45 g. sulphostab i/v.

7.1.42: Given 0.3 g. sulphostab i/v.

This last injection was given personally by the Senior Medical Officer. Preparation of the solution and injection were alike carefully carried out and the dramatic results that followed were probably caused by the drug itself which proved to be one of the toxic batch.

Within two hours of the injection the patient was acutely ill and his temperature had reached 105° F. Vomiting was an outstanding clinical characteristic and the vomit contained both blood and bile. As a result of experience with previous cases, remedies in common use such as adrenaline and sodium thiosulphate were avoided but glucose and ascorbic acid were forced as far as vomiting would allow. Fever was controlled by tepid sponging. The blood-pressure was very low—95/?40 mm. mercury.

8.1.42: The patient was still very ill in the morning. Certain characteristic signs had developed overnight—signs dependent upon acute capillary toxæmia. There was marked congestion of the small vessels on the scleræ of the eyes and of the external acoustic meatus. There was likewise swelling of the eyelids and, to a less marked degree, of the face itself. Auscultation of the lungs revealed a mild degree of bronchitis. The retinæ and optic discs were normal. Over the chest, abdomen and back the skin was erythematous and a faint scarlatiniform mottling could be seen here and there. On this and succeeding days treatment was by: (1) Potassium bromide and belladonna; (2) glucose, 6 ounces; (3) insulin, 10 units m. et n.; (4) ascorbic acid, 15 tablets (each 25 mgm.), crushed in water; (5) fluids *ad lib*.

9.1.42: The patient's condition had improved very greatly. The temperature was now 99.6° F. and the pulse-rate 108 per minute. Treatment was continued much on the same line with ever decreasing doses of insulin until 14.1.42, when the pulse-rate finally stabilized and became normal in rate.

Comment.—(1) A severe toxæmia following with unusual suddenness upon a toxic dose of arsenic.

(2) The amelioration in the patient's condition which followed on treatment with insulin.

Case 5.—Sweeper P. S. Fatal case of serous apoplexy.

The patient was an apparently healthy individual and, as so often happens in such cases of hæmorrhagic encephalitis, the serious result of arsenical therapy was unpredictable.

10.11.41: Admitted to hospital with an indurated syphilitic chancre of the coronal sulcus. He had marked œdema of the prepuce, due to secondary infection of the sore, and balanitis. It was on this account that he was given a course of sulphonamide (30 g.) by mouth concurrently with his early arsenical injections.

13.11.41: Given neosalvarsan 0·3 g. i/v, bisiacol 1 c.c. i/m.

20.11.41: Given neosalvarsan 0·45 g. i/v, bisiacol 1 c.c. i/m.

27.11.41: Given neosalvarsan 0·60 g. i/v, bisiacol 1 c.c. i/m.

During the period of these injections, the patient appeared fit and well, there was no albuminuria and weight and appetite were maintained.

3.12.41: At 0500 hours he was found by the Medical Officer in epileptiform convulsions. The onset had been very sudden and without premonitory signs. He was frothing at the mouth, the pupils were widely dilated and he was incontinent of urine. By 1000 hours he was deeply unconscious and breathing stertorously. On examination of the fundi of the eyes the disc margins were found to be normal but the veins grossly congested. The pupils were non-reactive to light. All the limbs were spastic and twitching. Kernig's sign was not present but both plantar responses were extensor in type.

Blood picture: R.B.C. 5,375,000 per c.mm. Hb. 90 per cent. W.B.C. 20,625 per c.mm. Polymorphs 80 per cent, lymphocytes 15 per cent, monocytes 5 per cent. Lumbar puncture: Clear fluid under slightly increased pressure. Otherwise the cellular and chemical content of the C.S.F. was normal.

By 2100 hours the temperature had risen to 104° F. and the pulse-rate was 150 per minute. 2200 hours: Cheyne-Stokes respiration. 2300 hours: Pulse thready and uncountable; patient vomiting blood and mucus. Lumbar puncture was again performed to reduce the C.S.F. pressure but the patient died shortly afterwards.

An autopsy was performed by Captain Reynard Smith, I.M.S., and these excerpts are taken from his report.

“Circulatory System.—No evidence of disease was found in the myocardium, endocardium or pericardium, nor in the coronary arteries, aorta or larger vessels.

Cranium and its Contents.—The skull cap was of average thickness and broke normally. There were no adhesions between it and the dura mater nor were there any adhesions between this membrane and the underlying leptomeninges.

There was no excess of cerebrospinal fluid and the surface convolutions of the brain were not flattened nor was there any cerebellar pressure cone present.

The surface vessels of the brain were grossly congested. On sectioning the brain, numerous small punctate hæmorrhages were found; these were especially noticeable in the white matter.

Liver and Spleen.—Were normal in size and consistency. Some areas of the cut surface of the liver were paler in colour and more mottled than is usual.

Histological Report on Sections Removed at Autopsy.—Brain: This section does not demonstrate well the changes observed macroscopically. There is only dilatation of the vessels and some slight perivascular infiltration with lymphoid cells.

Liver: Distributed in a patchy manner through all the zones of the lobules is seen a granular and fatty degeneration of the hepatic cells with

coalescence, loss of discrete cell boundaries and, in some cases, loss of nuclei. There is a very marked round-cell infiltration of the biliary tracts and also a similar infiltration around the central veins of some of the lobules.

Hæmorrhage has occurred into many of the sinusoids which are seen filled with erythrocytes and hæmosiderin. Also, there is observed proliferation of the reticulo-endothelial cells of Kupffer.

In short, the outstanding features discovered post-mortem were the intense congestion of the blood-vessels on the surface of the brain, the widespread but minute petechial hæmorrhages in the brain substance itself and the histological picture of acute toxæmia in the liver."

Comment.—(1) The unpredictable nature of such a mishap occurring during the course of anti-syphilitic therapy.

(2) There may occur a latent period of days during which the patient shows no neurological abnormality until the onset of coma which may appear with catastrophic suddenness.

(3) The difficulty of arriving at a diagnosis, should there be no history of anti-syphilitic treatment, is increased by the lack of characteristic changes in the cerebrospinal fluid.

Arsenical Dermatitis.—There occurred in the clinic nine cases of dermatitis, all of which recovered. Four of these were of a mild type and four proceeded to complete exfoliation. One, which was initially severe, made an exceptionally rapid recovery; this last case is described in detail below as Case 6. It was the only one in the series of dermatitis cases in which insulin was used. With the exception of Case 6, the severe cases were treated on conventional lines with glucose, alkalis, ascorbic acid and sulphur orally and with injections of sodium thiosulphate. Contramine was given in some. It seemed that no great benefit accrued from the use of sodium thiosulphate. Toxic signs developed between the second and the sixth injection in the majority of cases and all occurred during the first unit courses.

A widely held view of the causation of arsenical dermatitis is that the skin becomes sensitized to the drug itself. One of the cases encountered lends support to this view. An Indian soldier, through a mishap in injection, received an infiltration of the tissues of the right arm. Subsequent injections had to be given in the left arm. But four weeks later, when he developed a papular dermatitis, the eruption made its first appearance on the back of the right arm and forearm. A mishap was anticipated in the case of another patient when, one month after recovery from exfoliative dermatitis, he was inadvertently given an injection of 0.45 g. novostab i/v. In this case, however, nothing untoward occurred, which tends to show that skin sensitization is not a factor in all cases of dermatitis. A further investigation two months later and the application of a solution of 3 per cent arsenic to his skin in the form of a "patch-test" produced a negative result.

Case 6.—Private H. H. Early arsenical dermatitis.

This case was unique in our series since it occurred at the end of a period of experience of many cases.

During this time many interesting examples of toxæmia had been insufficiently investigated and empirically treated. It had been decided that, if insulin were in reality of importance in the treatment of the later arsenical toxæmias, a severe case of early dermatitis would fully test its worth as a therapeutic agent; and this was such a case.

26.2.42: Patient admitted and after investigation was diagnosed as a case of sero-negative primary syphilis.

1.3.42: Given novostab 0.3 g. i/v.

4.3.42: Given novostab 0.3 g. i/v. He vomited following both these injections.

6.3.42: Patient fit and well, discharged to duty.

10.3.42: He was discovered in a medical ward. He had been taken ill suddenly on 8.3.42, two days after his second injection. On that day and the day following his temperature had reached 105° F.

When examined he was found to be covered with a morbilliform eruption; this rash was confluent here and there on the trunk but was absent on the face. The limbs showed the rash on both the flexor and extensor surfaces. The face was flushed and swollen. The capillaries on the surface of the eyeball and in the external ear were markedly congested as were the veins coursing over the retina.

A simple capillary resistance test was carried out on the left arm with a Baumanometer, the mercury being maintained at a level just above diastolic pressure. This produced a crop of petechiæ on the skin of the forearm within one and a half minutes. The blood-pressure was 115/70 mm. mercury. The blood urea was returned as 31.2 mgm. per cent and the urine contained albumin.

Treatment was initiated with fluids, glucose, ascorbic acid and alkalis and, since the case had been discovered late in the afternoon, the first injection of insulin (10 units) was not given until 1830 hours. A further 5 units was administered at 2330 hours.

11.3.42. The temperature had dropped to normal and the patient felt much improved. The morbilliform rash had become confluent over most of the body surface and on the left arm were scattered ecchymoses which had resulted from the test of the night before. Insulin was given thus: 1000 hours, 10 units; 1730 hours, 5 units. Glucose, six to seven ounces, was forced daily. The blood-pressure was 104/60 mm. mercury and the icteric index 10.

By 1800 hours the patient affirmed that he felt very much better and it appeared that the skin eruption was fading in colour.

12.3.42: In the morning he was afebrile and his pulse-rate was normal. The rash had vanished except for the petechiæ on the left forearm. One curious feature was his small urinary output. The intake of fluid had been large and the bladder seemed to be empty when percussed. The blood urea, however, remained at the reasonable figure of 30 mgm. per cent. The blood-pressure was 108/65 mm. mercury.

Insulin was given thus: 1130 hours, 5 units; 2200 hours, 5 units.

Fluid intake was 7 pints and output was 4 pints. This output began in the afternoon. In the morning the patient had passed only 6 c.c. urine: it was of a glue-like colour and was almost solid with glistening crystals which had the appearance of mica. Microscopic and biochemical examination failed to reveal their precise nature. The icteric index had fallen to 4.4 and the R.B.C. fragility test proved normal when tested against a control. The blood-picture was as follows: R.B.C. 5,140,000 per c.mm.

Hb. 80 per cent (Tallquist scale). W.B.C. 4,450 per c.mm. Polymorphs 55 per cent, eosinophils 2 per cent, lymphocytes 35 per cent, monocytes 8 per cent.

The patient showed a slight evening rise of temperature to 99.2° F. A rough test of capillary resistance, carried out as before, produced a few petechiæ only after a period of five minutes.

13.3.42: Patient was perfectly well and a capillary resistance test proved to be negative. A last dose of 10 units of insulin was administered before noon. The blood-pressure was 110/60 mm. mercury.

Convalescence was uneventful and the patient was discharged fit on 27.3.42.

This soldier was recalled to the clinic one month later for a "patch test." Within two hours of the application of arsenic to the skin of the arm, he experienced a burning sensation. The skin area was examined some twenty-four hours later and the patch removed. The area was swollen, hot and erythematous and covered with small papules and vesicles. The surrounding skin showed papules here and there. The patient said he felt slightly sick but his temperature and pulse remained normal during the period of seventy-two hours while he was under observation.

These cases are described merely because they are interesting in themselves and to emphasize that insulin may be used with great advantage in the treatment of the later toxæmias of arsenic. No reference has been made to other work on the subject because, in an isolated station such as this, there is no means of access to current medical literature.

Throughout these studies we were grateful for the guidance and co-operation of Major R. J. G. Morrison, R.A.M.C., and Captain W. R. Smith, I.M.S. Without their help this article would not have been written. And if the treatment of these cases was as successful as it is thought to have been, then the success was due to those who administered it—the R.A.M.C. orderlies of the unit.

MEDICAL OFFICER OF A P.O.W. CAMP.

BY CAPTAIN R. S. VINE,
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THE following article is based on a short talk given to the Officers and Senior N.C.O.s of a South African Field Ambulance being formed in the Middle East at the time. I am encouraged to publish it in view of the interest aroused. Much first hand experience of the sort of people we are fighting is to be gained from such a post as S.M.O. of a P.O.W. Camp.

War is not a modern phenomenon due to present social conditions: men have always fought whether they liked it or not. May be they did like it or else we would not be having wars, but as long as there have been wars there have been prisoners-of-war. Their condition has changed considerably throughout history and the day is far removed from those unhappy times in antiquity and in the Middle Ages when slavery, the galleys or torture and death were their almost certain fate. Nowadays they are treated with humanity: note one speaks of "prisoners-of-war" and not just "prisoners." Captured soldiers are not criminals. Apart from the fact that the Geneva Convention lays down complete instructions for the treatment of P.O.W., it is obvious that an ordinary soldier, however much we may hate those who inspire and lead him, is carrying out his duties and is in normal times a man of peace, often much more so than a war-like civilian. If this is borne in mind, the correct attitude will be adopted towards captured soldiers, particularly in the case of highly disciplined German soldiers, who are very amenable to tactful but firm handling. They will automatically obey a definite order clearly given provided that it is not one which they are not entitled to obey. German doctors are soldiers first and physicians second (this also applies to padres, etc., as witness the fine stand made by Major Bach at Sollum in January of this year). Doctors can be very regimental indeed and it is a revelation to see a German doctor's command of a squad of nursing orderlies. One gets the impression that he would cut a very smart figure on the parade-ground; a thing that it must be admitted could be said of few of our M.O.s.

While I am on the subject I had better continue with a very brief description of the German Medical Services. A German doctor, dentist or padre joins the army in the first place as a private soldier and his subsequent promotion depends as much on his leadership of men as on his professional capacity. He may never rise above the rank of Gefreiter—Lance-corporal. In our camp we had a qualified dentist who ranked as a full corporal, and a doctor who was an "Unterarzt," i.e. just less than a second lieutenant. The medical personnel were organized into Sanitary Companies in addition to Regimental Nursing Orderlies, Stretcher-bearers and Assistant Stretcher-

bearers. There were also larger medical units such as field ambulances and hospitals. The M.O.s were mostly under 30 years of age, and were specially keen. The clinical acumen of the young M.O.s I met was in my opinion of the standard of good senior students. Particularly in the case of the Germans they seemed to rely too much on the firm of Bayer at the expense of a good grounding in elementary pharmacology. They seemed to be unfamiliar with the usages of the ordinary drugs but knew the appropriate "patent" preparation produced by the big German firms. One M.O. admitted he didn't know how to use *nux vomica* as he had always been accustomed to *cardiazol* or *coramine*.

This predilection for "patent" medicines applies even more to the Italians who used to order all sorts of fancy preparations and were especially keen on calcium injections as a panacea for all ills. They bought many patent preparations privately.

The young M.O.s were prone to take the most serious view of relatively simple cases, e.g. they frequently diagnosed cases of mild cardiac overstrain as "myocarditis." This happened in several cases submitted as candidates for the Mixed Medical Commission and may of course have been done with the idea of "wangling" somebody through but I think in many cases it was done in good faith and the M.O.s were quite agreeable to accept the diagnosis of the S.M.O. in these as in other cases. There was never at any time serious difference of professional opinion between the German M.O.s and the S.M.O. The German M.O.s examined their own sick personnel and for this purpose a M.I. tent was established in each pen, where daily sick parades were held by the M.O. detailed for the purpose.

As regards the general health of the P.O.W., I would say the following. The Italians taken in the original 1940 push, when we unexpectedly captured Graziani's army, were I understand a very miserable and scruffy looking lot and pictures taken at the time undoubtedly bear witness to this fact. I did not see them at the time but when I took over the medical arrangements of the camp in July, 1941, they were already looking fit and bronzed and very well fed! Mussolini might have felt justly proud of his gallant army boldly marching past—to the shower-baths! A few "enemy" escorts with tommy-guns might have clouded his brow, but unquestionably being captured and fed on good British Army rations will undoubtedly benefit the future Italian nation. Many of the poor fellows had never seen so much food before and the meat was a bit too much for some of them. The few taken early in 1942 were an extremely ill-assorted looking lot compared with the Germans. The latter were on the whole in an excellent state of fitness as would be expected of a picked body of men such as the Afrika Korps. Those taken early in 1941 were very fine specimens and those taken late in 1942 were also very good. The Germans captured in the November, 1941, offensive were mostly very young, scarcely out of their 'teens, and many of them were very white, having obviously only recently arrived in Libya. The average age of the German soldiers was.

between 20 and 30. Few were over and those who had served in the last war could have been counted on the fingers of one hand. The Italians were of all ages, many of them having been civilians in Libya, and included old men of over 60. On the whole they were of smaller stature and less clean-looking than the Germans, but the latter were by no means models of hygiene. I sometimes discovered latrines soiled by Germans who had squatted on the top of the structure! The environs of the cookhouses were not always what they should have been but, when horror was expressed that German soldiers were not as clean as the Italians (whom we had well trained by this time), the matter was quickly put right.

Owing to the fact that Graziani's army was taken practically intact, there were relatively fewer casualties amongst the Italians as compared with the Germans. Frequently the Germans (and Italians too) tried to get away with minor trifling complaints and there were the inevitable "lead-swingers." In this connexion the agreeable working arrangements with the P.O.W. M.O.s came in most useful for, whereas a M.O. might encourage the malingerer with the inevitable waste of time and material, a M.O. whose confidence has been won will co-operate most heartily in eradicating the pest. There were a number of diseases which prevailed amongst the P.O.W. both before and after capture. Diphtheria was prevalent in Libya during the period preceding the Allied offensive of November, 1941. Serum had been scarce and, in addition to a number of fresh cases which occurred among recently captured P.O.W., there were several cases of post-diphtheritic complications. —

There was also a considerable epidemic of infective hepatitis amongst the same group of German P.O.W. Amœbic dysentery was prevalent amongst the Germans captured at Halfaya Pass in January, 1942. A large number of disorders of the urinary tract developed amongst the P.O.W. whilst in this camp. The cases were divided into three groups. Group I, renal colic and nephrolithiasis (32 cases during the first six months of 1942); Group II, "nephritis" (44 cases) and Group III, pyelitis, cysto-pyelitis and cystitis (48 cases). Group II included, besides genuine cases of acute or subacute nephritis, cases of an obscure ætiology that might easily be classed in Group I. These latter cases had a fairly constant symptomatology and were characterized by renal pains followed in a day or two by the sudden onset of generalized œdema with ascites and dyspnoea and in some cases by marked hæmaturia. The majority of cases occurred between the end of March and the beginning of June. Calcium oxalate crystals were present in a few cases. In most of the patients there was no previous history of renal trouble. They had been in Libya about a year. The matter was brought to the notice of the A.D.H. of the area as it was thought that perhaps there might have been some nutritional disturbance in spite of the fact that the rations of the P.O.W. were adequate and they had access to a well-stocked canteen whence they could buy eggs, fresh fruit, etc. Two R.A.M.C. specialists were brought by the A.D.H. and after examining the

cases it was agreed that there was no question of food efficiency. The condition cleared up fairly quickly in hospital on a salt-free diet only. Unfortunately the visit of the specialists was followed shortly after by the fall of T— and events moved too rapidly to permit of further investigation in a bigger hospital. I personally have not seen so many urinary disorders in British troops and nothing of a similar nature occurred amongst the camp staff. There were nine cases of malaria during the period under review, two being malignant tertian (Italians). The latter had already been in the camp six months but were probably not primary cases: one had a hydatid cyst of the spleen in addition. The remaining seven cases were benign tertian malaria, three being primary. Two of these were in a couple of German soldiers who slept side by side in a tent and developed malaria the same day. A malarial carrying mosquito, *A. pharoensis*, was caught on several occasions in the camp and it was known to breed in the neighbourhood. Culicine mosquitoes readily bred in the grease-traps if given a chance and I found experimentally that if fresh water was left standing with a little nutritive material in the form of powdered biscuit added, small culicine larvæ were visible to the naked eye on the fifth day.

The hygienic arrangements of the camp were highly satisfactory and full use of P.O.W. labour was made. The Italians were generally willing enough to work. As a matter of fact the enforced idleness of a P.O.W. camp is one of the greatest trials P.O.W. have to contend with and they often beg to be put on some job or other in order to have something to do. The original drainage system of the camp was, I understand, largely designed and constructed by Italian Engineers and a Sanitary Squad of Italians carried out the most useful and essential work in connexion with latrines, grease-traps, etc., under the supervision of R.A.M.C. personnel. Since I have been at the camp deep trench latrines have been in use and have always worked satisfactorily, being easily made fly-proof. An annoying habit of both Germans and Italians was the insertion of stones under the hinged edge of the drop-lid covers in order to keep them open while in use. These stones were frequently left in situ causing loosening of the hinges and eventually the lids came off. They seemed to be abnormally sensitive to the pressure of the lids in the small of their backs—probably disturbed the peaceful trend of thought! We never had this bother with the latrines used by the British troops who were far more fly-conscious.

The P.O.W. taken in December-January, 1941-42. Allied offensive were naturally enough pretty dirty and lousy after their life in the Western desert. Many had already been bathed and disinfested before reaching our camp but the majority were heavily louse-infested. They were washed and deloused by a M.B.U. attached to the camp for the purpose. The bathing arrangements of the camp were eminently satisfactory for, apart from the great amount of individual bathing that took place in all the pens under the taps (and latterly we had fixed up a few extensions to the taps with shower-bath roses attached), every P.O.W. had a hot bath once in

ten days when the camp was full, and once every seven days or less when there were fewer numbers. There was generally little difficulty over this but there were occasionally some "artful dodgers," especially amongst the Italians, and a register had to be kept to make sure everybody was bathed. Once one German soldier refused to join the bathing party on the plea that it was undignified for a German to be marched under escort of "black troops," as he described an Indian guard. It was pointed out that the racial history of the Indians was centuries older than that of the Germans. Delousing a pen can be a heart-breaking job unless it is seen that absolutely everybody and all clothes are cleared out and that the disinfector is working properly. Otherwise, just as a pen is finished, somebody cheerfully produces a live louse and the whole lot may have to be redone. As a routine, patients' kits were thoroughly deloused on admission to the camp hospital and stored till their discharge. A T.O.T. box steam disinfector was used for this purpose. Bugs were destroyed by kerosene and the whole hospital was de-bugged by swabbing the tent walls, especially the pockets for the poles where the bugs hid. This work was superintended by the German M.O.s and was done very thoroughly.

The Germans are born organizers and, as soldiers are models of discipline, being collectively like sheep, are easily directed. Their collective standard of intelligence is that of average schoolboys and like schoolboys they can be sulky, cruel and stupid. They seem to be very prone to be governed by the mob instinct and showed remarkable harshness in taking "justice" into their own hands as in the following case. A young fellow who was beaten up by his comrades was brought to me one morning. He was literally a mass of bruises and abrasions with both eyes swollen and blackened. Bruises were especially noticeable in the lumbar regions where he had been savagely kicked after being knocked down. The reason for this unwarranted treatment was that he was prone to petty theft and was dirty in his personal habits. He had been thrown out of the tent and made to sleep in the open. He was definitely a case requiring psychiatric treatment and had he been reported in a normal way the matter could have been dealt with in a proper manner. This was not the only case in which German soldiers had to be rescued from unpleasant treatment at the hands of their brethren but it serves as a typical example. One evening the P.O.W. were given a kind of fatherly talk by the Camp Commandant in which they were advised to behave themselves and not to make so much row, etc. This was followed in some instances by rude noises and cat-calling. Immediately the order was given throughout the camp (through the loudspeakers) "The C.O. directs that the P.O.W. will instantly cease to behave like children and will go to bed quietly like German soldiers!" The noise stopped at once and they all went sheepishly to bed. The Germans organized themselves into separate companies, kept themselves fighting fit by sports, gymnastics and other exercises (presumably waiting for Rommel to relieve them!) and when on one occasion the senior N.C.O.s were sent

to another camp, the junior soldiers stepped into their places and carried just as much authority.

The psychology of the German and Italian P.O.W. is a subject too big for a talk of this nature but one or two points of interest may be mentioned to show certain differences. The Italians are of course more artists than soldiers and all facilities were accorded them to develop their artistic talents. In the pens they made beautiful architectural models from sand-bricks made by themselves, and a row of tents with finely constructed garden walls, gates, archways, model churches, parks, etc., looked for all the world like an elegant suburban district. The German constructional instincts were in most cases directed to warlike subjects—"sand-table" models of a battle terrain, aerodromes, etc. The Italians were excellent modellers in stone and here again the subjects chosen were chiefly non-military unless they were commissioned to make ashtrays and other objects with British or Allied Army badges chiselled out. One Italian made a fine model of a horse and pyramid with the words "Viva il Duce" and the Fascist symbol at the side. Also recorded was the fact that this model had been the work of ("lavoro ricordo") so-and-so, a Blackshirt. The artist in question was complimented on his work of art but it was suggested that if he took it back and chipped out "Il Duce" and the Fascist symbol, and substituted the words "Il Re" and the arms of the house of Savoy, the beautiful piece of art would be preserved. The man took the piece away and carried out the suggestions in front of his Blackshirt comrades. While mentioning this story I may as well tell you of another amusing incident in connexion with the words "lavoro ricordo," which, briefly translated, simply means "the work of," and was frequently written on many of their models along with their names. Many objects in stone such as ashtrays, decorative shoes, pyramids, sphinxes, etc., were made, and some of these found their way to New Zealand when a New Zealand guard was stationed in the camp. One day a remarkable letter arrived at the camp from a New Zealand lady addressed to "Lavoro Ricordo," congratulating him on his beautiful workmanship and hoping he was well and could he do some more things for her for which she was willing to pay? The Germans were excellent chorus singers and seemed to sing best without music, whereas the Italians had to have musical accompaniment. The Germans are naturally very serious about everything connected with military matters and do not realize when they are having their legs pulled. A certain German officer air-ace was in the habit of walking about his pen at night apparently examining the wire. When asked why he did not sleep, he said he suffered from insomnia. He was requested to remain in his tent from the hours of 10 o'clock at night till 6 o'clock next morning and not be wandering about at night otherwise the sentries would not get a wink of sleep! He was not amused but kept to his tent. A P.O.W. will try to get a bit of false propaganda past the censor if he can. One day a letter was received from the P.O.W. censorship department for information and investigation. A German soldier had written that they were fed on

"lentils, rice and beans," and sometimes for a change, on "beans, rice and lentils." He was brought before the Camp Commandant to explain and it was suggested that he added as a P.S. that in addition they got meat, eggs, milk and a variety of other vegetables and that they had a well-stocked canteen where they could get on credit such things as eggs, fresh fruit, more vegetables and cigarettes. The letter was accordingly amended, but it would have served him right had he been fed for a while as he had mentioned!

I have rather wandered from the point of the strictly medical. There are several other things I should like to talk about. I mentioned earlier the German Medical Services. With customary thoroughness nearly every man who claimed to be protected had a Red Cross Geneva Convention card. In some cases, though, these cards were not in the possession of the protected personnel for one reason or another, a circumstance which led to a great deal of extra work on the part of the P.O.W. camp staff to establish the bona fides of such personnel. It should be explained that such documents as Red Cross Cards and Paybooks are the personal documents of soldiers, and are the only real proofs they can offer of their identity.

One of the most important experiences one has in connexion with P.O.W. is the direct dealing one frequently has with representatives of Neutral Powers representing enemy countries. They are naturally interested in the state of health of the P.O.W. A Mixed Medical Commission consisting of Neutral and Allied Medical Officers periodically examines candidates submitted by the S.M.O. as suitable for repatriation in exchange for our own wounded held by the enemy. These contacts with representatives of other countries add greatly to the interest of looking after P.O.W.

I hope I have given you a fair picture in the time at my disposal of the sort of things one is up against in dealing with P.O.W. It is work a little out of the ordinary but is full of interest and calls for not a little ingenuity in the intelligent handling of some of the situations that may arise. A knowledge of the German and Italian tongues naturally makes the job a hundred times more interesting but it is certainly not essential as one nearly always finds a M.O. who speaks English fairly well. At one time we had an Italian officer patient who had been educated at a well-known Public School and spoke English better than Italian! With a little tactful handling the M.O.s were generally very helpful not only in a professional capacity but in quelling any tendency to mutiny on the part of the P.O.W. If they understand you are not going to put up with any nonsense from them and, at the same time, you are obviously doing the best you can to assist them to carry out their professional duties with as little hindrance as possible, they are only too willing to reciprocate in any way. This applies equally to Italians and Germans.

My thanks are due to the Camp Commandant for his kind help. It is to his ready wit that credit must be given for the happy solution of many of the ticklish situations that arose.

Editorial.

" THE SANITATION OF THE MARCH."

WITH QUOTATIONS FROM THE WORKS OF THE LATE COLONEL CHARLES
HENDERSON MELVILLE, *C.M.G.*, *A.M.S.*

THE recent death of Colonel Melville is a sad reminder that even the most enlightened and skilled attention to the welfare of the British soldier is, for the individual, but a temporary effort and that all the hard work and worry must, sooner or later, be left for others to take up and go on with as they, in their turn, find it necessary.

Colonel Melville, as Professor of Hygiene at the Royal Army Medical College in 1911 and 1912, was a stalwart in the struggle to bring to the soldier the best that knowledge and experience could devise. We remember him as the keenest of the keen, the very embodiment of efficiency and the mirror of self-discipline in the cause of others. It was especially upon all that concerned the endurance of the soldier and the physiology of the marching unit that his greatest interest lay. We recall vividly the "hunger marches" which he arranged for and participated in; experimental marches full of significance for the future of the Army and for the comfort of the soldier. One of the principal facts brought to notice, as the result, was the need for ample hydrocarbons. "A party consisting of one officer and twenty N.C.O.s and men of the Loyal North Lancashire Regiment, with three medical officers and some details, was encamped on Salisbury Plain from October 11 to 23. The food was carefully restricted to the issues laid down in Allowance Regulations and a certain march, in heavy marching order, carried out every day. A careful record was kept of the actual ground covered and an estimate of the energy so expended made, on the lines detailed in the chapter on 'The March'." Melville says that "the men at the conclusion of the march showed a pinched, starved appearance and signs were not wanting to show that most of them, and more particularly the heavier members of the party, had come close to an end of their reserve stores of fat." His conclusion was that "the food principle the lack of which was most felt was fat." A definite craving for sugar was also experienced "but not nearly so strongly as in the case of fat."

Melville published his book on "Military Hygiene and Sanitation" in 1912. It was a wonderful book and it has amply repaid us to take it up again and peruse it in the light of subsequent events. Written with the supreme ease of a master of the English language and with the specialized knowledge of a first-rate hygienist, it makes indeed a splendid tribute to his memory now that he is gone. In it he has introduced a very excellent chapter on "Marching." In his course of lectures on Army Sanitation, too, given at the Royal Sanitary Institute in 1911, he devoted an important section

to "The Sanitation of the March" which deserves to be read with a fresh interest in this present time of war effort and military trial. Much of the detail is, perhaps, no longer accurate; many of the minor recommendations have been for so long a matter of course that they need not now be laid stress on. But the principles remain and their vigorous expression makes them worth quoting again and again.

"What, then, is marching?" he asks. The answer is given as follows—"Walking; carrying a certain load, disposed on the body in a certain manner, wearing certain clothes, arranged also in a certain manner, at a pace regulated not by the physical necessities of the individual but by those of the body of troops of which he forms a part." . . . The fact "that a man has to carry a load not as he would wish to but in a manner that leaves his limbs unencumbered and his hands free for fighting, that he has to walk at a certain pace so that the unit he belongs to shall arrive at its destination still a formed military body and not a straggling mob, the fact that he has to wear a certain uniform so that he may be distinguished from the enemy and recognized as a person entitled to bear arms; all these combine to make the difference that exists between the civilian who says 'Let us go for a walk' and the soldier who is ordered to march a definite distance, in a definite time and for a definite purpose." All this is as true to-day as when it was written thirty odd years ago. Again, "It must never be forgotten that every decimal point that a man's temperature goes up unnecessarily is so much superfluous energy expended and fuel used up that may be needed later on. *Just as a good engineer will nurse his engine so a good Commanding Officer will nurse his men on the march.*"

On the subject of loss of water by perspiration he says—"On one occasion, at Aldershot, a man in good training lost as much as $5\frac{1}{2}$ lb. on a seven mile march on a hot day." . . . "A man cannot afford to lose more than one-tenth or thereabouts of the water in his body without serious consequence." . . . "The ordinary soldier, weighing ten stones, contains in his tissues generally altogether about 95 lb. of water so that $9\frac{1}{2}$ lb. is about his limit of possible loss. The man I have just referred to lost somewhat more than half of this in seven miles and certainly could not have gone much further without water. *The obvious deduction is that if you are going to march men you must water them.*" "There are two varieties of thirst which I call respectively 'the thirst of habit' and 'the thirst of necessity.' The former is the thirst that assails the ordinary unregenerate man as a reflex sensation resulting from the sight of the 'Red Lion' or the 'White Horse' or some similar visual stimulus. For the civilian there is no particular danger in this thirst but the soldier must be educated out of it. If he is so educated then he will realize, and, what is more important, his officer will realize, *that when he complains of thirst it is no longer the thirst of habit but the thirst of necessity, that is, a thirst that is the expression not merely of a dry throat, but of water-starved tissues, a thirst that must be slaked if the engine is to run any longer.*"

Then, as to the feet, Melville puts the general principle in a way that strikes one as both sound and witty. "*It may not be true, absolutely, to say that clean feet are sound feet but it is absolutely true to say that dirty feet are unsound feet.*" And of hyperhydrosis—"The feet of the battalion as a whole may be left to the care of the Company Officer but those of the men afflicted with profuse sweating must be the care of the Medical Officer in person."

Of the boots he writes—"Every man should be prepared to turn out with one sound pair of walking boots, sufficiently worn for the feet of the owner to be accustomed to them, and in good repair. *To start marching with soft feet in a new pair of boots is suicidal.*" On the other hand, Melville was not inclined to expend much pity on the trained soldier who reported sick with sore feet. "If a cavalry soldier rubs his horse's back he is not unlikely to hear a few home truths as to his fitness to belong to the mounted arm. If a soldier rubs his feet there is no particular reason why he should receive more sympathy."

On the other hand he is very sound on the giving of alcohol to the troops. "It should be given" he says "at the conclusion, never before or in the middle of work." We cordially agree with him in this. As he says, "the man who comes into camp cold and drinks his 'tot' of rum between the blankets, close to a fire, undoubtedly retains sufficient heat in his body as the result of the combustion of the alcohol to be of serious value. The same man, drinking his rum before standing as sentry in an exposed position, on a cold night, will probably suffer a loss of heat greater than the amount actually to be credited to the combustion of the spirit." In spite of the mention of a fire, so comfortable in the old times before aeroplanes and bombs were thought of, the right *principle* pervades the paragraph and makes it remarkable and just even to-day.

We commend "Military Hygiene and Sanitation" to everyone and we feel sure that we may add our deepest sympathy to Mrs. Melville on a loss which, while heavy to his old friends in the Corps, must be hard indeed to his companion for a great part of his lifetime.

THE NEW FELLOWSHIP REGULATIONS.

A DIPLOMA of Fellow of the Royal College of Surgeons has for so long, and so definitely, been recognized as the hallmark of a Surgeon that any changes in the form of the examination cannot fail to attract notice.

Since the Fellowship was established in 1843 no material change has taken place in this relationship. In the year of its centenary, and in the fourth year of this war, radical alterations in the form of the primary examination and in the terms controlling admission have been introduced by the Council of the College.

Admittance to the examination is now open to all candidates on the same terms; the differential treatment of members of the College having been eradicated. The primary examination is now divided into two sections, namely, (i) anatomy and normal histology and (ii) applied physiology and the principles of pathology. The examination can be taken any time after graduation in medicine but not before. A carefully worded syllabus is published which expressly states that a knowledge of principles, and not of details, will be expected and this assistance should encourage the candidate who may be somewhat appalled at the possible extent of knowledge expected of him under the new terms.

The change outlined should remedy the dissatisfaction which has been voiced from time to time at the demand from an embryo surgeon of a full knowledge of modern physiology. The limitations set on this subject and the addition of the principles of pathology appear to us a sound change. It should impose on the trainee surgeon subjects of study likely to be of value to him in his subsequent career.

The final examination under the new regulations cannot be taken till two years have elapsed from the date of an accepted qualification having been obtained. It is still only necessary for a six months post to be held in a recognized General Hospital. Some would have extended this period further but, at any rate, the new conditions impose no hardship on the sharpest of the examination candidates and insure against snap results.

The dates of examination are so planned that candidates can now take primary examinations within a period of a few weeks. This arrangement should prove of no little value to Service or overseas competitors.

We think the College is to be congratulated on the broad-mindedness of the changes which it has introduced and which should increase, if anything, the standing of their fellowship.

Clinical and Other Notes.

TREATMENT OF ACUTE GONORRHOEA BY A MASS UNIT (10 GRAMS) DOSAGE OF SULPHAPYRIDINE.

BY MAJOR W. H. DICKINSON PRIEST,

Royal Army Medical Corps.

Specialist in Venereology.

THE search for an optimum dosage of sulphapyridine and allied drugs in fresh uncomplicated cases of gonorrhœa continues.

This is an analysis of 485 cases treated at a Military Hospital in England by one large (10 grams) dose of sulphapyridine administered immediately upon admission.

It was intended originally to complete a series of 500 cases treated with this drug, and of another 500 treated with sulphathiazole in similar dosage, and to collate these with another series including some sulphadiazine-treated cases, in conjunction with Major J. Marshall, R.A.M.C., and Dr. René Guillermin of the Fighting French Forces. The exigencies of the Service however made it impossible to complete this research.

The method is at present only considered suitable under the best conditions in a temperate climate; I have not thought it wise to continue it under active service conditions in a sub-tropical climate as a routine treatment though further experience may modify this view.

I am satisfied however that the results obtained in England compare not unfavourably with other schemes of dosage.

METHOD OF ADMINISTRATION.

As soon as the diagnosis of acute gonococcal urethritis is established microscopically, 20 tablets of sulphapyridine are crushed to powder which is stirred into half a pint of milk and given as soon as is practicable after a patient's admission to hospital.

He is confined to bed for twenty-four hours on a fluid diet and made to drink copiously of water or barley water under supervision. At least five pints a day should be consumed. He is encouraged to open his bowels as freely as possible but no aperient is given, unless strongly indicated to lessen the incidence of vomiting.

The occurrence of nausea after this large dose is frequent but actual vomiting is not.

All patients are given as a routine a stock mixture—

B Pot. bic.	...	...	...	...	gr.	x
Pot. cit.	...	...	...	...	gr.	xx
Tinct. hyoscyami	...	...	...	...	m	x
Infus. buchu	...	...	...	ad	ʒj	

and this is taken for the duration of their stay in hospital three times a day.

GENERAL OBSERVATIONS.

At the commencement of this series it was not felt wise to rely solely on a unit dose only and a further 4 grams were given during the subsequent forty-eight hours. In all, 86 patients, i.e. 17.7 per cent of the total, had this extra maintenance dose. This was however gradually dropped, as it was found that patients did just as well without it, and the figures show that the average stay in hospital was slightly longer when the maintenance dose was given.

Having had extensive experience of the "intensive" or modified "Aberdeen" scheme of therapy I am of the opinion that at least as good results are obtained from this much less toxic mass unit dosage with vastly less constitutional disturbance and great economy of sulphapyridine tablets.

In no single case in this series was hæmaturia or anuria observed nor were there any disquieting symptoms.

Instrumental interference and prostatic massage have been reduced to a minimum in straightforward cases, the former being confined to final tests of cure and the latter to third and final surveillance tests of cure.

Under Service conditions an investigation of this nature can never be entirely satisfactory owing to the impossibility of personally following up

<i>Number of patients</i>	<i>Had unit dosage sulphapyridine</i>	<i>Had extra 4 grm. maintenance dose sulphapyridine</i>	<i>Had additional routine course sulphapyridine, viz. 25 grm. in 7 days, 6, 4, 3, 3, 3, 3</i>	<i>Had irrigations (average period 5.5 days)</i>	<i>Complications</i>	<i>Passed final test of cure</i>	<i>No traceable final test</i>	<i>Average stay in hospital—days</i>	<i>Remarks</i>
41	+	—	—	—	—	+	—	7.5	
46	+	+	—	—	—	+	—	8.3	
56	+	—	—	—	—	—	+	8.4	
40	+	+	—	—	—	—	+	9.4	
86	+	—	—	+	—	+	—	11.7	
110	+	—	—	+	—	—	+	11.5	
49	+	—	+	+	—	+	—	25	4 had two routine courses sulphapyridine, 1 had one routine course sulphonamide
				(from 2 to 18 days)					
48	+	—	+	+	—	—	+	27	
2	+	—	+	—	+	+	—	12.5	Complications
7	+	—	+	—	+	—	+	30.5	Right epididymitis, 5
									Left epididymitis, 2
									Prostatitis, 7
485 Total									Total Average Stay in Hospital .. 16.6

a large proportion of patients as far as their final tests of cure (three months later). Constant moves and postings made it impossible to trace more than 43 per cent right up to final test.

I have however made frequent inquiry among my colleagues in charge of other V.D. Centres and have had no evidence that these patients subsequently did less well than on other schemes of treatment. The results are summarized below.

From the above analysis it will be seen that 379 patients, i.e. 78 per cent, required no further routine course of sulphapyridine and their average stay in hospital was 9·4 days.

106 patients, i.e. 21·8 per cent, required a further course or courses of sulphapyridine and their average stay was 23·7 days. The total average stay of all cases was 16·6 days.

There were seven known relapses though the possibility of re-infection has always been considered.

Irrigations when given were anterior or posterior as indicated and were of a solution of potassium permanganate 1:8000. They were given either once or twice daily.

CONTACTS.

In spite of every effort being made to trace the infecting contact and ensure that she attended the nearest clinic for examination and treatment it was only found possible to trace 31 per cent.

I have always found that in most cases the soldier was collaborative and willing to help in this important matter as far as he could but it is remarkable how large a proportion of infections were the result of a single casual association where neither the name nor the address had been inquired, no attempt had been made to obtain a second rendezvous and no description of any value could be obtained, and this by no means in all cases under the influence of alcohol. The sociological implications here are not without interest.

6 per cent of infections were due to admitted professional prostitution.

2·1 per cent were attributable to infection by members of the Women's Services.

Three men claimed to have been infected by their fiancées.

One was of homosexual origin.

15 per cent patients denied exposure to risk and could not be shaken in their denial.

15 per cent were attributed to marital infection. The rise in this last percentage has been markedly noticeable in the latter half of 1942. In 1941 my figures showed a marital percentage of 8 per cent. This also is of sociological significance.

The remaining 62 per cent were the result of "amateur" encounters or liaisons.

I am indebted especially to Corporals Willis, Gavin, and Mapes, R.A.M.C., for their assistance, clinical and clerical, throughout this investigation.

WOUNDS CAUSED BY BLANK CARTRIDGES.

BY MAJOR G. H. RAYMOND,

Royal Canadian Army Medical Corps.

OUR interest in wounds produced by the discharge of blank cartridges has been aroused recently due to the admission of several patients suffering from such injuries. The fact that these wounds are comparable to ones produced by live rounds was not at first fully appreciated and it is wondered whether, in view of the wide use of blank ammunition in training schemes, the average rank and file understand the dangers attached to its discharge at close quarters.

As a preface to the experiment to be described let us consider what occurs on discharge of a live round in the firing chamber of a rifle. The principle involved is essentially the same in the case of a blank round. A charge of powder either black or smokeless is enclosed in a brass cylinder. The powder is ignited by the percussion of a fulminating mixture in the cap. The powder charge burns producing a quantity of gases at very high pressure and temperature. These gases swell the cartridge case outwards thus firmly sealing the firing chamber and releasing the hold on the bullet. The pressure then starts the base of the bullet moving forwards until it is mushroomed or "set up" as it is called by engaging in the grooves of the rifling of the barrel. This prevents the escape of gas in advance of the bullet. The pressure of the contained gases increases until in the case of the modern Service rifle it amounts to about 20 tons to the square inch. Due to this pressure the bullet passes out from the muzzle, the confined gases behind it give a backward thrust to the gun and the sudden expansion of released gas causes the report. As the bullet emerges it is accompanied by a blast of highly compressed hot gas, particles of unburnt powder, smoke, flame and fragments of wad. When the bullet leaves the weapon it is acted upon by a series of forces. The most important is the forward movement and the rate of this movement varies with the pressure of the gas within the barrel—e.g. the muzzle velocity of the Service rifle is about 3,000 feet per second. The next most important movement is spin due to the rifling of the barrel—in the Service rifle this amounts to one complete turn in every 10 inches—therefore the bullet has imparted to it a spin of about 3,000 revolutions per second. Other factors affecting the flight of the bullet, such as air resistance and gravity, will not be considered here.

When a missile strikes and becomes embedded in the body two forces are at play, namely the energy of the missile and the resistance of the body. The energy of a missile equals half its mass times the square of its velocity. Thus the velocity is of much greater importance than the mass. Piercing of objects however considerably reduces the velocity.

The resistance of the body depends on the type of tissue in the path of

the missile. But the pure hydrostatic effect must be considered—when a rapidly moving object strikes a fluid or semifluid medium, the force is distributed in all directions and this may result in extensive bursting of the particular part as well as damage to tissues and organs remote from its path. This cavitation and fragmentation is thought to be particularly accentuated by the spinning of the bullet at high speed when it enters the body. Of the tissues of the body, bone naturally produces the greatest resistance and fascia, aponeurosis and muscle follow next in that order. The differences in resistance provided by different tissues cause the course of the missile to deviate from a straight line.

The contents of a .303 inch blank cartridge, namely the wad and charge of powder, are shown in fig. 1. The wad consists of compressed cardboard about $\frac{1}{2}$ inch in diameter and $\frac{1}{16}$ inch thick. The powder is composed of discs of a nitro-cellulose compound.

Three abbreviated case reports are presented to show the devastating effects produced by the discharge of .303 blank cartridges in Service rifles.

Private D. was participating in a unit scheme and was sent to reconnoitre a hedge. As he crept through the hedge an "enemy" lying on the other side of it fired a blank round at him at close quarters (exact distance not known). He died before medical aid was reached. Externally there was seen a small puncture wound of the skin below the right costal margin, while post-mortem examination revealed a shattered right lobe of the liver.

Private P. was also participating in a unit scheme when someone accidentally fired a blank round at about 3 inches distance from his left buttock. On examination there was a skin wound of entrance about the size of a 6d. At operation it was found that this overlay a cavity the size of a small orange. The cavity was filled with blood clot, pieces of the wad, battledress, unburned flecks of powder and minced muscle. In depth it extended down to the sciatic nerve, though the nerve itself was not damaged.

Private L. was unaware of the blasting effect of a blank round so held the muzzle of his rifle lightly against his boot on the dorsum of his foot and pulled the trigger. External examination showed a small hole in the leather overlying a skin wound in the web between his third and fourth toes about the size of a 6d. X-ray examination revealed a comminuted fracture of the proximal phalanx of the fourth toe. At operation the wound cavity extended down between the third and fourth metatarsals to the skin on the plantar surface of the foot though the skin was not disrupted.

Amazed by the extent of these above-mentioned wounds, the following experiment was conducted. Moulds of fireclay about 5 by 5 by 5 inches were made to the consistency of putty as this was thought to resemble the consistency of the muscle mass of the thigh. On the open face of the mould a single sheet of white linen paper was placed in contact with the clay to represent the skin. Later a single thickness of battledress was tied over the open face of the mould at about $\frac{1}{2}$ inch distance from the paper so as to resemble the resistance of the normal clothing of a soldier. .303 blank cartridges were then fired from a Service rifle at the open or cloth-covered

faces of these moulds at varying measured short distances. The results may be seen photographed in figs. 1 and 2.

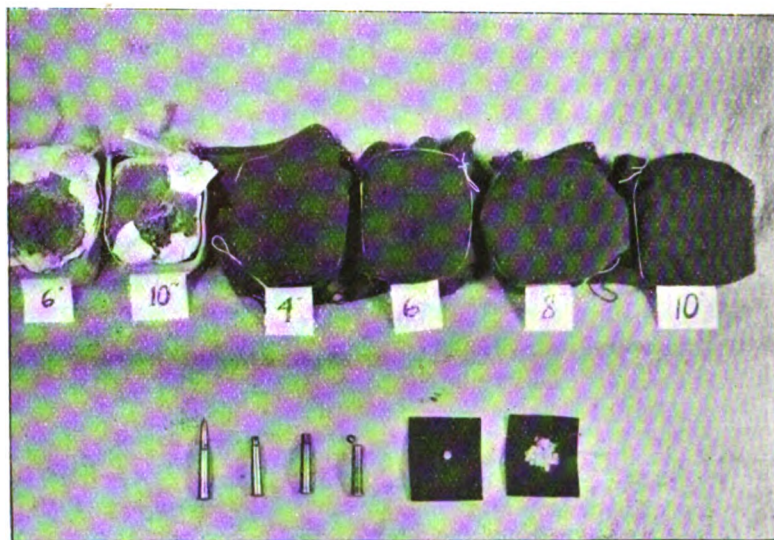


FIG. 1

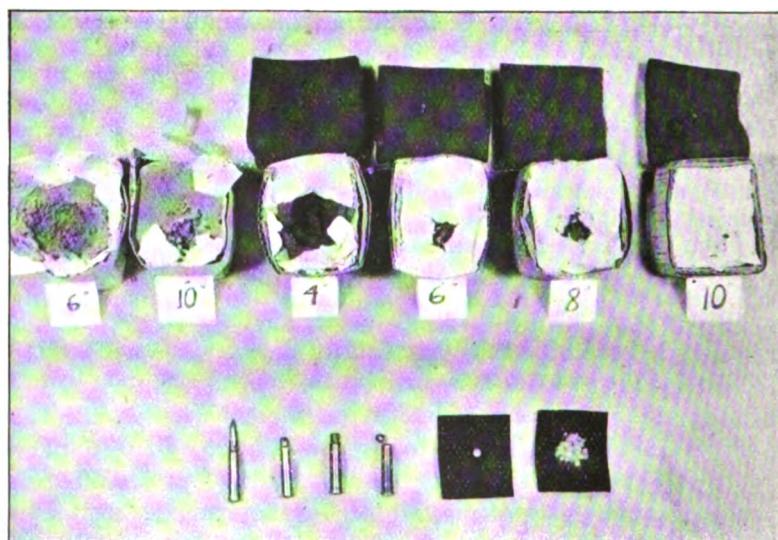


FIG. 2

At 0 inch the mould was completely disintegrated and fragments were scattered for a distance of 3 feet.

In fig. 1 the moulds may be seen without and with battledress covering

fired at from inches distant corresponding with the numerals below. Of the two moulds without battledress covering, the cavity of that produced at 6 inches measures 3 by 3 by 2 inches, while that produced at 10 inches measures 2 by 2 by 1 inch. Of the moulds covered with battledress, those at 4 inches and 6 inches show a defect produced in the cloth while the others show flecks of unburnt powder and wad on the surface.

Fig. 2 shows primarily the extent of damage to the molds after firing through the battledress covering. At 4 inches the cavity measures 3 by 3 by 3 inches; at 6 inches it measures 2 by 2 by $1\frac{1}{4}$ inches; at 8 inches it is $1\frac{1}{2}$ by $1\frac{1}{2}$ by $1\frac{1}{4}$ inches; at 10 inches it lightly penetrates the paper and abraids the surface to the depth of $\frac{1}{4}$ inch. In all cases the cavities contain fragments of the wad and battledress and flecks of unburnt powder.

The lower line of each figure from left to right shows a live .303 cartridge, a blank .303 cartridge, the casing of a blank round after firing, a blank round opened to show the contents, the compressed cardboard wad and the discs of smokeless powder from a blank round.

This presentation is put forward merely as a matter of interest and only two conclusions are suggested.

(1) Wounds produced by the discharge of blank cartridges are of much greater extent than was heretofore imagined.

(2) Wounds of varying degree will probably be produced by a .303 inch blank cartridge discharged from a Service rifle up to 10 to 12 inches from the target.

In conclusion I wish to express my appreciation to Colonel J. A. MacFarlane, Surgical Consultant, Canadian Army Overseas, my Commanding Officer, Colonel G. Earle Wight, and the Chief of the Surgical Division, Lieutenant-Colonel S. J. Martin, for permission to forward this article.

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EXFOLIATIVE DERMATITIS FOLLOWING PHENOBARBITONE ADMINISTRATION.

By MAJOR H. BATHURST NORMAN,

Royal Army Medical Corps.

THE extensive use of phenobarbitone in medical practice makes it particularly important that attention should be called to the rare but nevertheless serious complication of exfoliative dermatitis which may arise in the course of its administration. Of twelve recorded cases, nine terminated fatally. Wile and Benson, who themselves reported two of these cases, state that

though few cases have been described in the literature, such reactions are by no means uncommon, fatal cases being allowed to go undiagnosed or, if recognized, not recorded.

The commonest cutaneous manifestation of phenobarbitone intolerance is an erythematous macular rash. Sexton, Pike and Neilson emphasize the necessity of withdrawing the drug at the first appearance of such a rash. Even then a severe constitutional reaction may occur but a fatal outcome will probably be avoided. Moss and Long have lately described two further cases of exfoliative dermatitis due to phenobarbitone. Both patients were alarmingly ill but ultimately made a good recovery. They, too, think that many cases are missed. A history of drug ingestion is not easy to obtain and phenobarbitone is probably the cause of many cases which are vaguely described as "atypical erythema exudativum multiforme."

An interesting feature in the case here reported was the notable symptomatic improvement which followed the administration of nicotinic acid.

Case History.—The patient, a serjeant, aged 26, with four years' military service and no history of previous illness, was admitted to a military hospital on February 27, 1943, with a purpuric rash and pyrexia of fourteen days' duration. Two months previously he had developed a sore throat with rise of temperature and was in a regimental aid post for five days; he then returned to duty though feeling far from well. After a further period of five days he was admitted to a local hospital owing to shortness of breath and a recurrence of sore throat and during this time was given small doses of luminal amounting in all to about eight grains. He then developed a blotchy rash on his hands and feet which later became generalized all over the body. He had some cough and phlegm, headache was intense and there was high swinging fever, the temperature reaching 105° F. During the following days the rash became more intense and was now polymorphic with strong purpuric element present. There was enlargement of all lymphatic glands. The appetite was poor, the bowels constipated and the patient was very acutely ill. The patient was seen at this time by Lieutenant-Colonel Felix Smith, R.A.M.C., who suggested the diagnosis of barbiturate dermatitis.

Other diagnoses considered at this time were: acute leukaemia, Hodgkin's disease, glandular fever, toxic erythema multiforme and the pre-mycotic stage of mycosis fungoides. Some of these were excluded by the following investigations which were done: Paul Bunnell test—negative. Blood Wassermann reaction—negative. Total white cell count—16,400. Polymorphs 34 per cent, lymphocytes 60 per cent, monocytes 4 per cent, eosinophils 2 per cent. Pathological investigation of urine—negative.

Such was the situation at time of transfer to the military hospital. Physical examination after arrival showed no evident anaemia. Conjunctivitis was marked and the throat injected with a hæmorrhagic rash on the buccal mucous membrane. There was an extensive erythematous and purpuric rash on the trunk and limbs, exfoliating on the face with cracks and sores on the lips. The tongue was smooth with atrophic papillæ. Manifest oedema of the extremities was present with much tenderness of the palms of the hands and soles of the feet. The cardiovascular system was normal and the blood-pressure 120/90. The lungs showed generalized bronchitis. The spleen was not felt. All lymphatic glands in neck, axillæ and

groins were moderately enlarged. The central nervous system was normal. The urine contained no sugar or albumin. On admission the temperature was 102° F. and the pulse-rate 98.

On February 28, 1943, the blood count was as follows: Red blood cells 4,855,000; hæmoglobin 86 per cent; white blood cells 11,800; polymorphs 31 per cent, lymphocytes 27 per cent, eosinophils 30 per cent, monocytes 11 per cent, platelets 261,590. Blood group A11. Capillary resistance test—normal. Marrow puncture—normal. X-ray examination of chest—"generalized bronchitis."

By March 4, 1943, the general condition had considerably deteriorated with continued pyrexia and extensive exfoliation of the skin on hands, forearms and face. The presence of cheilosis associated with atrophic glossitis and skin rash of pellagrous type suggested the possibility of therapy with vitamin 2B. Nicotinic acid was therefore given, the patient taking 500 mgm. daily. Within forty-eight hours there was a dramatic improvement in his condition; the temperature dropped to normal and he appeared noticeably less weak. During the next few days exfoliation of the skin proceeded but the temperature remained normal and the general improvement was maintained. The urine contained a trace of albumin but there were no casts present. The glandular enlargement was no longer apparent.

On March 12, 1943, the eyelids became extremely inflamed with multiple styes which soon were discharging pus. At the same time a large carbuncle developed on the right hip. There followed multiple boils all over the body, the incidence being greatest in the axillæ and groins. These persisted for some weeks and a number of them required incision. The axillæ and groins were dusted with a sulphonamide powder and during this period brewer's yeast and marmite were taken, together with ascorbic acid 100 mgm. daily.

By April 12, 1943, the septic condition of the skin had improved. There was considerable loss of hair and the nails were shed but the patient's condition generally was satisfactory. The blood count was: Red blood cells 4,410,000; white blood cells 5,800; polymorphs 52 per cent, lymphocytes 32 per cent, eosinophils 9 per cent, monocytes 6 per cent.

A skin sensitivity test for phenobarbitone subsequently performed gave a positive result.

Comment.—Exfoliative dermatitis is a rare but serious complication of phenobarbitone administration. In hospitals where the drug is widely used the possibility of such complication should be remembered. Of twelve recorded cases in the literature nine terminated fatally. In the present instance the apparent benefit derived from nicotinic acid therapy is considered noteworthy.

My thanks are due to Colonel G. P. Kidd, M.C., for his permission to record this case.

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SEXTON, D. L., PIKE, G. M., and NEILSON, A. (1941.) *J.A.M.A.*, **116**, 8, 700.
MOSS, R. E., and LONG, W. E. (1942.) *Arch. Derm. and Syph.*, **46**, 386.

NEW TYPE OF SODIUM ARSENITE FLY TRAP.

BY MAJOR I. GURLAND,

*Royal Army Medical Corps.**Officer Commanding a Field Hygiene Section.*

THE following is a description of a simple type of Sodium Arsenite Fly Trap which is being made and used, with excellent results, by the — Field Hygiene Section.

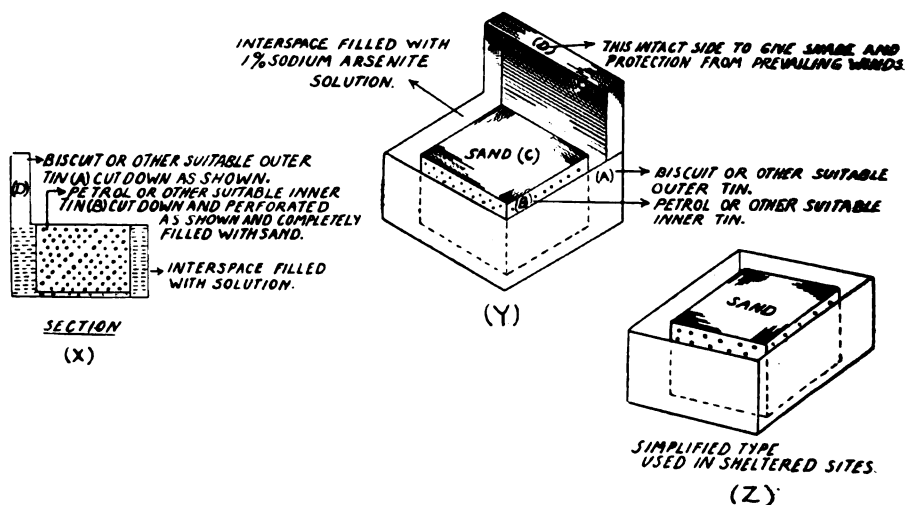
It is the idea of Staff-Serjeant Shanks of this unit.

Materials required for construction.

(a) Biscuit or other tin (A) cut down as shown in accompanying diagrams (X) and (Y).

(b) Perforated petrol or other tin (B) cut to the same height as (A).

SODIUM ARSENITE FLY-TRAP.
NO 9 FIELD HYGIENE SECTION.

*Method of Working.*

(a) Petrol tin (B) is completely filled with sand and then placed in biscuit tin (A), which, if used in the open, is placed with its intact side (D) against the prevailing wind.

(b) Sugared 1 per cent sodium arsenite solution ($1\frac{1}{2}$ ounces to one gallon of water) is now poured into the interspace of the two tins until biscuit tin (A) is almost full. (It is an advantage if stale beer or lemonade dregs are added.)

The sand in petrol tin (B) is thus saturated and a constantly moist poison area (C), always flush with the surface of the trap, is presented to flies.

Notes on Working.

(a) Topping up with water in biscuit tin (A) is carried out as necessary and fresh 1 per cent sodium arsenite solution added once per month.

(b) Latrines and sheltered areas are the sites of choice.

(c) When intended for a sheltered site, it can be made as in diagram (Z), without the intact side (D) shown shaded in diagram (Y).

(d) Smaller sized and different shaped tins can be used as available, e.g. small perforated circular jam tin fitted into a larger circular tin, etc.

Conclusions.

(a) It is simple to make and easily made by units themselves.

(b) There is no need for daily attention such as is required in the "Roller" type of fly trap.

(c) It overcomes the water-logging problem found in the "Floating Raft" pattern of sodium arsenite fly trap, as the area (C) which acts in lieu of the raft, being sand, is always flush with the surface of the trap.

(d) As no hessian, wood, wire netting, etc., are required, there is a great saving in material and labour and this makes an ideal fly trap for forward and other areas where these materials are hard to obtain.

TRANSPORT OF SICK AND WOUNDED BY 15-CWT. LORRY.

BY CAPTAIN S. HALES,

Royal Army Medical Corps.

No reference appears to have been made in the "R.A.M.C. Training" Manual of the use to which a 15-cwt. lorry can be put, with reference to the transport of sick and wounded—1935 Edition, Paragraph 472—yet during the last three months I have successfully carried two stretchers on a 15-cwt. lorry; this does not appear possible at first sight but, in fact, the resulting "Ambulance" is highly satisfactory.

In order to place the stretcher into position, the canvas in front has to be loosened, when the stretcher handles are made to rest on the upright partition which forms the front of the inner compartment. One stretcher is placed on either side, coming in contact with the side, this resulting in a centre "corridor" for a medical orderly or a third "lying down case" which can rest on blankets placed directly on the 15-cwt. lorry floor. Posteriorly, the two stretchers rest on a metal bar which passes through the runners; this bar is easily removed if stretchers are to be exchanged and rests laterally on the side uprights of the lorry.

The two hooks normally found on either side of posterior flap of 15-cwt. lorries come almost in contact with outer posterior runners and they prevent stretchers from slipping inwardly. Much space remains for first-aid kits.

Reviews.

THE DYSENTERIC DISORDERS. By Sir Philip Manson-Bahr, C.M.G., D.S.O., M.D., F.R.C.P. With an Appendix by W. John Muggleton, M.S.M. Second Edition. London: Cassell and Company, Ltd. 1943. Pp. xiv + 629. Price 30s.

This volume is a revised edition of the original, first published in 1939. Its appearance is a welcome addition to the reference books on tropical medicine available at the present time.

New matter added includes a chapter on pellagra, a description of the sulphaguanidine treatment of bacillary dysentery and, in the appendix, a section on the use of rectal swabs and desoxycholate-citrate medium in bacteriological diagnosis. The illustrations, paper and binding maintain the high standard set by the previous edition.

This valuable book can be confidently recommended to medical officers called upon to treat dysentery at home or overseas. R. D.

WAR WOUNDS AND INJURIES. Second Edition. Edited by R. Maingot, F.R.C.S., E. G. Slesinger, O.B.E., M.S., F.R.C.S., and Ernest Fletcher, M.A., M.B., M.R.C.P. London: Edward Arnold and Co. 1943. Pp. vii + 499. Price 35s.

The second edition of this little book on war wounds is not far from being a fresh work. Two new editors are responsible for the production and many new contributors, who now total twenty-seven, have been roped in; the pages have been doubled and so has the price.

The scope of the volume has been extended by the addition of chapters on the crush syndrome, sulphonamide therapy and burns.

The aim has been to present current thought on wound treatment as it is formed in this country. No military surgeon with experience in the Middle East has assisted in the work. As a result there is a certain lack of balance in the views put forward and an absence of first hand information on procedure and experience in the Field.

The chapters on Injuries of the Nerves, by Bremner Highet, and that on Chest Injuries, by Tudor Edwards, are perhaps the best. The section on sulphonamide therapy contains a mass of information on the best known of these drugs although its conclusions as to their value in wound treatment are perhaps necessarily somewhat hazy at the present time.

In the section on burns a preference for the use of coagulant methods is apparent which is hardly in line with the current practice in the Army and Air Force.

The book is well produced on good paper and the illustrations are evenly distributed in relationship to the subject matter and are mostly clear and generally useful. C. M. P.

THE STRUCTURE OF MORALE. By J. T. MacCurdy. Sc.D., M.D. Cambridge: The University Press. 1943. Pp. vii + 224. Price 8s. 6d. net.

The difficulty in defining all that is meant by "morale" is amply demonstrated by the wide sweep of this discourse on its structure. The psychological analysis is easily followed based as it is on the theory of conditional reflexes, but the author's desire to build a complete picture involves a complex approach from many angles—historical, cultural, economic and political. It is inevitable that any particular reader will tend to quarrel with some of the author's political interpretations but it will nevertheless help almost anyone to clarify his own ideas.

The author's views on the effects of bombing are especially interesting and embody an explanation of the paradoxical stimulation of morale by light raids which supplants the present Allied policy of dealing thoroughly with one area at a time.

The analysis of the morale of the various belligerent countries is comforting to us except in the case of Japan where the author believes the national character fulfils the conditions for perfect morale. He can therefore "see no cure for this cancer in the body of humanity except its extirpation."

For those whose ideas about morale are still at the elementary stage where it is equated with discipline a study of this book is recommended.

A SYNOPSIS OF SURGICAL ANATOMY. Fifth Edition. By A. Lee McGregor. M.Ch.Edin., F.R.C.S.Eng. Bristol: John Wright and Sons, Ltd. 1943. Pp. xiii + 710. Price 25s. net.

This handy little volume is an established favourite among practising surgeons and previous editions have been favourably commented on by this Journal. This new edition shows no material changes beyond useful additions. The original type of diagrammatical line drawing has been adhered to. These diagrams are often ingenious and always clear.

A new section on lesions of the intervertebral disc is introduced. This gives a lucid outline of the anatomy and contains a balanced survey of the clinical conditions associated with pathological lesions of the disc.

A no less careful account has been added of the supra-spinatus tendon and deltoid bursa. This description follows Cadman closely and should be found of assistance in the diagnosis and treatment of disabilities in the shoulder area.

C. M. P.

Correspondence.

WITH A FIELD AMBULANCE IN LIBYA.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I wish to draw attention to the following statement by an Assistant Instructor, Officers' Wing, Depot R.A.M.C., on training policy for Field

Ambulances in the October, 1942, number of the Journal (p. 167): "In conclusion it is emphasized that personnel of Field Ambulance units must be regarded and trained primarily as soldiers; competence in first aid, although essential, must always be secondary to their training as Field Troops." The statement is further elaborated stressing that training should be devoted to teaching the man to look after himself at the expense of teaching him to look after his patient. In fact the whole trend of this part of the article is to belittle the importance of treatment and care of the patient.

Such a statement, emanating from such a source, demands a strong refutation. Indeed it is self-contradictory since the only object in having a Field Medical Service is that it should be competent (and highly competent) in administering first-aid. The long line of evacuation makes this the more important.

After two years of desert warfare I have found that the height of the "ceiling" of competence depends entirely on how hard the man tries—and he must try very hard—to immobilize limbs (the Thomas splint and correct knots are surely important), to see that his patients' meals are warm and decently served, that the cook produces those meals promptly and that they consist of more than hot sweet tea and cold bully and that, when the water ration allows it, he gets a wash. A very great deal can be done provided everyone tries.

Mobility is obviously important but Commanding Officers of Field Ambulances have all found that a high degree of both first-aid (at times major surgery) and "medical comforts" can be maintained without loss of this mobility.

Unfortunately I have only just received this number of the Journal as a prompt denial of such a policy is very necessary. What a newly joined officer is told in his first week is often remembered for a long time.

I have only to add that it does not take a soldier very long to learn to look after himself.

I am, Sir,

Your obedient Servant.

No. — Light Field Ambulance,
Royal Army Medical Corps,
Middle East Forces.

A. P. TRIMBLE,
Lieutenant-Colonel, R.A.M.C.

May 6, 1943.

[The emphasis laid in this letter on the importance of training in first-aid is, after all, described by Captain Blackmore as "essential." We think that the two views expressed are, to a certain extent, complementary, though we thoroughly endorse the value of first-aid instruction.

The training of the personnel of a Field Ambulance must be first concerned with its mobility and effectiveness in the rapid evacuation of casualties. The training in the handling and first-aid treatment of the wounded man is equally important and perhaps a more difficult part.—Ed.]

Notices.

THE UNIVERSITY OF BIRMINGHAM.—CHAIR OF SOCIAL MEDICINE.

THE Council invites applications for the newly established Chair of Social Medicine.

The appointment will carry an initial salary of £1,500 per annum, but it is hoped that this will subsequently be increased to £2,000 per annum.

The successful applicant will be expected to commence his duties as soon as possible after the appointment has been made.

Further particulars of the appointment may be obtained from the undersigned to whom applications (twelve copies) must be submitted, with the names of three referees, on or before March 1, 1944.

*The University,
Edmund Street,
Birmingham, 3.*

C. G. BURTON,
Secretary.

GLOBIN INSULIN (WITH ZINC).

THIS is a new type of modified insulin, originated and developed in the Research Laboratories of Burroughs, Wellcome & Co. (U.S.A.) Inc., at Tuckahoe, N.Y. Experimental and clinical studies have shown that it is intermediate in rapidity of onset and duration of action between unmodified (soluble) and protamine zinc insulin. In many cases it affords satisfactory control of the blood-sugar level with a single daily injection without producing nocturnal or early-morning hypoglycæmia. In comparative tests it has been found possible to maintain patients on a smaller daily unit dose than is necessary with unmodified insulin or protamine zinc insulin. "Wellcome" brand Globin Insulin (with Zinc) is a clear aqueous solution containing 80 units per c.c. It is issued in rubber-capped bottles of 5 c.c. Further information is available from the manufacturers on request.

VISITORS' BOOK, ROYAL VICTORIA HOSPITAL, NETLEY.

THE original (pre-1917) "Visitors' Book" of the Royal Victoria Hospital, Netley, cannot be found.

This was of considerable historic interest and was kept in a glass-topped case in the Main Hall.

It is reputed to have last been seen about 1928 with many of the original signatures of Royalty, etc., cut out.

Will any serving or retired officer of the Corps who has any recollection of the said book or knowledge as to its present whereabouts kindly communicate with the Officer Commanding, Royal Victoria Hospital, Netley.

ERRATUM.

THE name of the author of the paper at page 92, Vol. LXXX, 1943, is Major A. Sachs, M.D., M.Sc., R.A.M.C., and not Major H. Sachs, M.D., M.Sc., R.A.M.C., as printed.



COOKED-UP FOOD consumed in badly ventilated underground cafes, on top of overwork and worry, is often the last straw that causes breakdown in the complex system resisting bacterial infection. Frequently "indigestion" paves the way. Seeking a simple treatment of rest for the digestive system doctors naturally turn to Benger's Food, which for many years has been the means of forestalling serious gastro-intestinal trouble. Benger's Food by virtue of its enzymic action is literally the only "food" which sustains the patient whilst allowing the degree of pre-digestion to be varied in accordance with the powers of assimilation.

THE ENZYMIC ACTION OF BENGER'S FOOD

As a result of self-digestive action by natural pancreatic enzymes, the milk proteins are so modified that when prepared Benger's Food comes into contact with the gastric juices, it separates into fine flocculi, presenting a very large surface area to the gastric juice. This is in marked contrast to the characteristic curd of unmodified milk. By the time Benger's Food is sufficiently cool to drink, the self-digestion is carried as far as it need be for all cases where digestion is partially impaired.

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JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS

Corps News.

SEPTEMBER, 1943.

EXTRACTS FROM THE "LONDON GAZETTE."

August 19, 1943.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the Middle East:—

The Military Cross.

Capt. (temp. Major) Robert Maxwell Johnstone, M.B. (56428), Royal Army Medical Corps (Edinburgh).

Capt. John Joseph Hogan (104608), Royal Army Medical Corps (Collain, Ireland).

Capt. John George Scott Holman (106831), Royal Army Medical Corps (Fisher).

The Military Medal.

No. 7345142 S/Sgt. Edward Henry Bonner, Royal Army Medical Corps (London, N.19).

No. 7344692 Sgt. Benjamin Matthew Abley, Royal Army Medical Corps (London, N.11).

No. 7348809 Cpl. Harry Norman Higginson, Royal Army Medical Corps (London, E.1).

No. 7404680 Pte. James Edward Sherwood, Royal Army Medical Corps (West Hartlepool).

The KING has been graciously pleased to confer the Efficiency Decoration upon the following officers of the Territorial Army:—

Royal Army Medical Corps.

Lt.-Col. J. G. Morgan (35510).

Major A. M. Jones (T.A.R.O.) (retd.) (51140).

Major I. H. Lloyd-Williams, M.C. (7765).

Major J. O. Moffat (32252).

Major H. W. L. Nichols (39736).

The Army Dental Corps.

Major F. W. Crook (44535).

September 16.—The KING has been graciously pleased to give orders for the

following promotion in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in North Africa:—

To be Additional Officers of the Military Division of the said Most Excellent Order:—

Major (temp. Lt.-Col.) Harry Thomas Chiswell (38868), Royal Army Medical Corps (Plymouth).

Major (temp. Lt.-Col.) Reginald Alfred King, M.B. (133614), Royal Army Medical Corps (Holland Park, W.11).

To be Additional Member of the Military Division of the said Most Excellent Order:—

No. 7345456 Warrant Officer Class II (Qmr.-Sjt.) (acting Warrant Officer Class I (Sjt.-Maj.) Francis John Russell Izzett, Royal Army Medical Corps (Croydon).

The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North Africa:—

The Royal Red Cross.

To be an Additional Member of the Royal Red Cross, First Class:—

Miss Annie Evelyn Read, A.R.R.C. (206401), Matron, Queen Alexandra's Imperial Military Nursing Service (Knaresborough, Yorks).

To be an Additional Associate of the Royal Red Cross, Second Class.

Miss Hilda Cryne (239981), Sister, Queen Alexandra's Imperial Military Nursing Service (Reserve) (Crosby, Lincs.).

The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in North Africa:—

Commands and Staff.

Maj.-Gen. (acting) E. M. Cowell, C.B.,

C.B.E., D.S.O., T.D., M.D., F.R.C.S.
(2804).

Col. W. D. Arthur, *M.B.E.* (15749).

Royal Army Medical Corps.

Col. (temp.) J. R. N. Warburton, *M.C.*
(1036).

Col. (temp.) T. Young, *M.B.* (10380).

Major (temp. Lt.-Col.) J. C. Barnetson,
M.B. (41955).

Capt. (temp. Major) E. G. Hough-
ton (114887).

Capt. (temp. Major) W. Ironside,
M.B. (199108).

Capt. (Qmr.) (temp. Major) J. W.
Jones (131467).

Capt. (Qmr.) (temp. Major) E. R.
Stanford (67465).

Capt. (acting Major) J. W. Totten,
M.B. (169476).

Capt. D. Collins (216683).

Capt. E. O. Low, *M.B.* (114195)

Capt. M. Young (171780).

7257803 W.O.I (R.S.M.) A. J. Catley.

7520996 Cpl. A. E. Ambrose.

7065604 Cpl. C. Peel.

August 20.—The undermentioned Con-
sultant is granted the local rank of
Brigadier:—

War Subs. Major (acting Col.) R.
Lees, *M.D., F.R.C.P.* (127138), May 20,
1943.

Capt. C. W. A. Hughes (90374), h.p.
list (late R.A.M.C.), retires with a
gratuity on account of ill-health Aug. 5,
1943.

August 24.—Lt.-Col. S. S. Dykes,
M.B. (15704), ret. pay, at his own request
reverts to the rank of Major whilst so
employed, July 28, 1943.

August 31.—The following Con-
sultant, R.A.M.C., is granted the local
rank of Brigadier:—

War Subs. Capt. (temp. Major) (acting
Col.) G. I. Scott, *M.B., F.R.C.S.*
(103393), March 10, 1943.

September 7.—Lt.-Col. G. F. Charles
(15721), from the A.D. Corps, to be Col.,
July 1, 1939, with seniority July 26,
1938. (Substituted for the notifn. in
"Gazette" (Supplement) dated Sept. 8,
1939.)

September 10.—The name of Capt.
(temp. Major) W. A. McD. Scott, *M.B.*
(73566), is as now described and not as
shown in "Gazette" (Supplement) dated
June 25, 1943.

September 14.—Col. (temp. Brig.)
H. C. D. Rankin, *C.I.E., O.B.E., M.B.,*
V.H.S. (8129), late R.A.M.C., to be acting
Maj.-Gen., June 1, 1943.

Lt.-Col. (temp. Col.) O. J. O'B. O'Han-
lon, *M.B., F.R.C.S.I.* (14869), having
attained the age for retirement, is
retained on the Active List supern. to
establt., Sept. 13, 1943.

Major (temp. Lt.-Col.) (acting Col.)
T. Stanton, *M.B.* (14552), to be Lt.-Col.,
Sept. 13, 1943.

Regular Army Reserve of Officers.

General List.

September 7.—The undermentioned
having attained the age limit of liability
to recall ceases to belong to the Reserve
of Officers:—

Col. H. H. Blake, *O.B.E., M.B.* (9383),
late R.A.M.C., Aug. 1, 1943.

September 10.—Col. T. H. Scott,
D.S.O., M.C., M.B. (5602), late
R.A.M.C., having attained the age limit
of liability to recall ceases to belong to
the Reserve of Officers, Sept. 5, 1943.

THE ARMY DENTAL CORPS.

August 27.—The notifn. regarding
Capt. H. C. Dobbie (58239) in the
"Gazette" (Supplement) dated Aug. 6,
1943, is cancelled.

September 10.—Lt.-Col. S. A. Redda

(27139) reverts to the rank of Major
whilst employed under the provisions of
Art. 496, Royal Warrant for Pay, 1940,
July 8, 1943.

DEATHS.

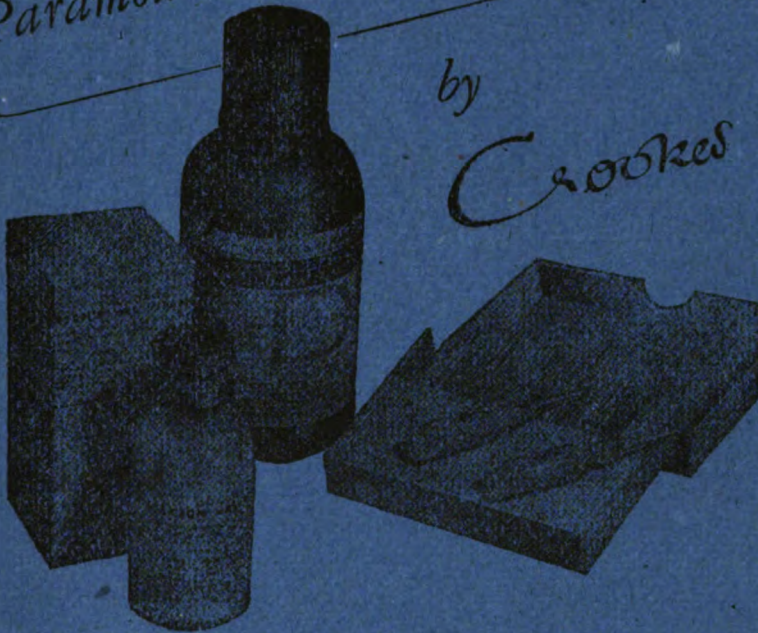
Major W. N. P. WAKELEY, T.A. Died
Aug. 26, 1943. Home.

Capt. H. G. GREEVES, S.R.

Lieut. R. WILSON, W.E. Died North
Africa, July 20, 1943.

Capt. L. HERBERT, W.E. Killed in
action, Sicily, July 27, 1943.

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Journal

OF THE

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MONTHLY

EDITOR.

COLONEL S. LYLE CUMMINS, C.B., C.M.G.

ASSISTANT EDITOR.

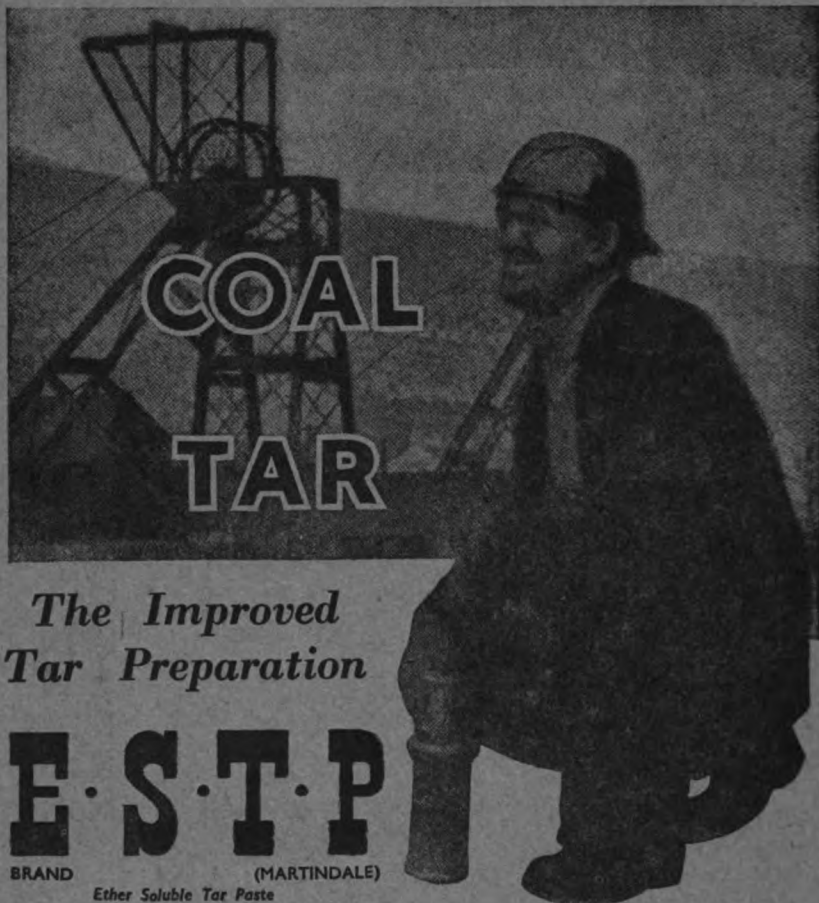
LIEUTENANT-COLONEL P. J. L. CAPON, R.A.M.C.

MANAGER.

LIEUTENANT-COLONEL C. A. WHITFIELD, R.A.M.C.

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Journal of the Royal Army Medical Corps.

Original Communications.

THE MEDICAL SERVICES IN AN ARMoured DIVISION.

BY COLONEL C. E. ECCLES,

A.D.M.S. — Armoured Division,

AND

MAJOR H. N. PERKINS,

Royal Army Medical Corps,

D.A.D.M.S. — Armoured Division.

[It should be borne in mind that Middle East has not yet adopted the new medical organization and that local War Establishment and Equipment Scales vary from those in existence in this country.—ED.]

THE Armoured Division is intended for employment in strategic roles, combining as it does great mobility with a high fire power. Its chief strength lies in its speed and weight in attack and thus its prime function in battle is to obtain the decision over the enemy by powerful thrusts or enveloping movements.

It is organized to carry out the following tasks :—

- (1) Break through the enemy protecting screen to secure early contact with the enemy main force.
- (2) Obtain possession of features of decisive importance to further operations.
- (3) Attack an advancing enemy and frustrate his plans.
- (4) Attack an enemy who is incompletely prepared.
- (5) Restore momentum to an attack which has come to a standstill.
- (6) Break through on a wide front against a demoralized enemy.
- (7) Exploit any success gained immediately and by deep penetration or rapid flank attack complete the destruction of an enemy.
- (8) Pursue a defeated enemy.
- (9) Attack to destroy enemy tank formations.

It will be readily appreciated that such a specialized military machine as the Armoured Division needs a very mobile and adaptable medical organization in support. This has been met by the formation of the Light Field Ambulance as direct successor to the previously existing Cavalry Field Ambulance.

Little information has in the past been circulated in regard to the medical organization and administration within such a Division and it is considered that the following brief notes on some of the many and varied aspects will not be without interest, especially as they are based on the experience and practice gained in an Armoured Division which has been continually in action since the opening of the campaign in the Middle East.

No emphasis has been laid on purely local conditions of desert warfare because it is desired to emphasize and correlate only conditions applicable and peculiar to an Armoured Division wherever it may be called upon to fight.

It will be convenient to group this article under the following main headings :—

- (1) The Regimental Medical Officer.
- (2) The Organization of the Light Field Ambulance.
- (3) Tactical employment of the Light Field Ambulance.
- (4) Evacuation of Casualties.
- (5) Divisional Medical Administration.
- (6) Communication.
- (7) The Field Hygiene Section.

(1) THE REGIMENTAL MEDICAL OFFICER.

The routine ordinary duties of officers in medical charge of effective troops have been laid down in Regulations for the Medical Services of the Army, 1938, paragraphs 165–192, and in many previous articles in the *Journal of the Royal Army Medical Corps*—and, thus, no further elaboration is necessary. In an Armoured Division there are, however, many points in connexion with the efficient function of the medical officer in battle that do need elaboration and it will be convenient to consider these in relation to the specific type of unit to which the officer is attached.

In all cases it has been found advisable to split up the authorized Regimental Medical Equipment into two portions—firstly, the essential battle equipment, to accompany the medical officer in action and, secondly, the heavier and less essential equipment sent in the medical three-ton lorry to the A.1 Echelon together with the ambulance car attached from the Light Field Ambulance in the rear.

The duties of officers in medical charge of Regiments, Royal Artillery, both Field and Light Anti-Aircraft, Royal Engineers and Royal Army Service Corps are similar to their counterparts in other formations and need no further discussion here.

(a) *Tank Regiment*.—The Medical Officer of a Tank Regiment must adopt a standard position on the ground during the battle period, i.e. in the vicinity of Regimental Headquarters, where he is in W.T. communication with all Squadrons via the regimental forward control. It is a definite and unalterable rule that casualties shall be brought to him and he will not (as has so often been the case

in the past) proceed into the throes of the battle to effect treatment as, in so doing, he may not be available for more urgent and serious cases elsewhere. In addition he may easily become a casualty himself and, in consequence, leave the unit without skilled medical attention at the critical stage of the battle. The duties of the medical officer have been somewhat simplified by the change that has gradually crept into tank warfare and the virtual disappearance of the cavalry type of joined battle for the pitched tank duel carried out from "hull down" positions.

It is essential for the Medical Officer to be provided with an armoured vehicle for his own personal use in battle. The Daimler Scout car (Dingo) has been found far more suitable than a White Scout car as, although the latter will carry two stretcher cases and the battle medical equipment, it is too lightly armoured for use within the sphere of a tank battle. It is obvious that the ordinary type of Austin K.2 Ambulance car cannot proceed forward of the A.1 Echelon and casualties must be evacuated to this point.

The problem of the ideal effective vehicle for the use of the medical officer remains as yet unsolved. It has been a problem that has been foremost in the mind since the earliest experiments in this connexion were made.

It is of interest to note at this juncture that German war establishments lay down two medical officers per Tank Regiment—one for duty in the neighbourhood of Regimental Headquarters and the second at A.1 Echelon.

In certain British armoured formations a similar arrangement—but on the basis of a British tank regiment—exists. This has not been found necessary or advisable in this Division and is considered wasteful in the use of the available strength of medical officers. It is the function of the Section of the Light Field Ambulance in the vicinity of the Brigade Headquarters to effect treatment in the battle zone over and above the most urgent and life saving measures.

(b) *Motor Battalion of the Armoured Brigade.*—The Medical Officer of the Motor Battalion holds a most important and valuable sphere in the Brigade medical arrangements. He will usually be sited behind his unit and in the vicinity of Tactical Brigade Headquarters with which he maintains close liaison.

With him, experience has shown, it is desirable to locate a small pool of three or four ambulance cars which can be immediately made available to any unit in the Brigade on demand by a message transmitted from the unit requiring assistance over the Brigade forward W.T. Link. In practice this procedure has been proved to be of inestimable value in the early and prompt evacuation of wounded to the Section forming the Advanced Dressing Station, this latter automatically despatching empty cars as full ones arrive.

(c) *Infantry Battalions of Motor or Lorried Infantry Brigades.*—It is submitted that no great difference in the medical aspect exists between the battalion on a motorized scale and that on a lorried infantry establishment. The essential point that must be continually borne in mind is the speed with which, in the attack, such a formation can move forward and thus evacuation of casualties on a very fluid basis should be maintained. In order that this can be effected the medical

officer must be completely cognizant of the development of the local situation at all times.

In a motor or lorried infantry battalion the medical officer must use his stretcher bearers to the utmost in order to effect rapid clearance of casualties. Holding of any casualties in the R.A.P. in view of the rapidly changing situation is an impossibility.

In the defence, with the anti-tank screen forward, the position becomes more strictly comparable with that obtaining in an ordinary infantry battalion with the proviso that, when the offensive is taken up, speed of movement once more becomes the dominant factor.

(d) *Armoured Car Regiment.*—An Armoured Car Regiment—to act as a divisional scout force—is part of an Armoured Division, but additionally a Light Armoured Brigade (consisting of Motorized Infantry, Artillery and Armoured Car Regiments or with light tanks in addition) may form part of the Division.

The medical problem encountered, in this case, is one of distance. Patrols may be working on reconnaissance or maintaining contact with the enemy over a very considerable front and over a depth of many miles. Individual cars may be compelled to render first aid to a wounded member of the crew and themselves carry him for long periods. For these reasons it is essential that the medical officer—normally located with Regimental Headquarters—is himself provided with a wireless set and is netted in on the regimental frequency.

In the case of armoured car regiments the White Scout car makes an ideal vehicle for the regimental medical officer. One side of the rear portion can be easily adapted to carry two stretcher cases whilst the other side is free to house the battle medical equipment and the wireless set.

Should casualties occur in numbers in a distant patrol or squadron, and the presence there of the medical officer be essential, covering protection for his vehicle and accompanying ambulance cars should be arranged. In general, in so far as is possible, the rule should be that casualties should be brought in to Headquarters Squadron—but this is not always feasible and under these conditions the R.M.O. is justified in proceeding to the casualties. Again, as the function of the regiment is essentially one of reconnaissance and long range patrolling, casualties in personnel are not of a heavy nature but may have to be held for a considerable period of time. As the terrain covered is almost entirely cross-country, the use of four wheeled drive ambulance cars is of paramount importance.

(2) ORGANIZATION OF THE LIGHT FIELD AMBULANCE.

A Light Field Ambulance is organized on the basis of a Headquarters which forms the Main Dressing Station and four or six sections according to the War Establishment upon which it is based. For ordinary purposes within this Division the four sectioned Light Field Ambulance has proved ample for all purposes, any further additional sections being considered to be somewhat redundant and a waste of personnel both in officers and other ranks. This point of view is, however, not acceptable to others who have held that an additional two sections are a very necessary desideratum.

In comparison with the normal infantry field ambulance the Main Dressing Station is of a much lighter capacity. No tentage is carried and shelters—or pent houses—provide the cover for patients. It is convenient to arrange for the provision of reception and two holding wards, each of which is carried complete in its lorry which not only transports the necessary equipment and personnel to run the ward but is also fitted up internally so that the load-carrying portion of the vehicle becomes an integral part of the ward when the pent-house has been erected.

In passing, it is thought advisable to point out that bitter experience has shown that the medical and ordnance equipment should not be carried in the manner shown in the official load tables for the following reasons :—

(a) Dispersal of equipment to minimize loss by enemy action, e.g. air attack, must be assured.

(b) The dispersal of vehicles is necessary under conditions of modern warfare.

(c) Readiness of access is needed on arrival at location where the unit will function.

(d) Conversely, it is well to provide for rapidity of closure when a further move is necessary.

The size of pent-house adopted in general is that using a forty foot square tarpaulin sheet as a basis. Many ingenious variations and methods of erection have been elaborated and descriptions have been previously given in detail. The type described in the recent article by Lieutenant-Colonel R. Johnston, R.A.M.C., is an excellent example. The actual types of pent-house and methods of erection are immaterial: the chief considerations are (i) ease and speed of erection and dismantling, (ii) good holding capacity, (iii) adequate shelter from both heat and cold.

In tropical climates nets, mosquito, or curtains, sandfly, are easily catered for—being suspended from the “goal post” supports. Nets also are an excellent anti-fly measure where helpless patients are concerned.

If the unit is static for any period, stretchers may be raised and converted to improvised beds by means of four earth filled petrol tins of 4-gallon capacity, one being placed under each runner. In the absence of suitable tins sand-bags may be employed.

No Light Field Ambulance can afford a display of tentage as, once it loses its capacity to move at the shortest notice, it ceases to be a useful adjunct to an Armoured Division in battle. For the same reason the tendency for all ranks of the unit to accumulate personal impedimenta must be ruthlessly pruned. Each and every member of the unit should be always in a complete state of readiness to move.

In order to retain mobility patients should not be held but evacuated as soon as possible. It has been, however, the practice not to evacuate patients after dark except in periods of moonlight. This is especially applicable under the conditions obtaining in desert warfare. Should the unit receive orders to move whilst patients remain, a Section should be left to evacuate these and rejoin the unit at the earliest opportunity. When a Field Surgical Unit is attached to the Main Dressing Station this becomes almost a standard feature of organization,

the Light Field Ambulance moving on at dawn, leaving the Field Surgical Unit and attendant Section to complete the previous night's operative surgery and evacuate these patients at first opportunity before rejoining the parent unit. In the case of serious abdominal wounds, the Section has often remained behind for several days until these patients have become fit for onward evacuation, the Field Surgical Unit having rejoined the Main Dressing Station on completion of its operation list. It has been found by experience that the Section that may be called upon to remain is, by and large, more permanently attached to the Main Dressing Station and may also combine this duty with that of resuscitation. This both conserves personnel and allows for detailed specialized training of the R.A.M.C. other ranks required.

The organization of the unit offices, quartermaster's department and stores is strictly comparable with that of any Field Ambulance and needs therefore no elaboration here other than to stress the needs for individual ingenuity in planning the lay-out and stowage of each vehicle load so that, on coming to rest, each department opens up without delay and conversely may close with equal speed.

Where no Field Surgical Unit is attached, urgent emergency surgery is carried out in the Main Dressing Station of the Light Field Ambulance and it has been found most suitable to use for theatre purposes a forty by twenty foot shelter attached to a vehicle and sited near to the reception and holding wards. At one time, a three ton lorry was used as an operating theatre—having been fitted up and converted to this purpose. Experience has shown this to be impracticable as the space available is limited, there is a difficulty in maintaining adequate cleanliness and man-handling patients on their stretchers in and out.

Trailers for a variety of purposes have been manufactured and used extensively in heavy field ambulances where they do undoubtedly serve a most useful purpose as an adjunct to normal vehicle establishment. In a Light Field Ambulance they have no place as they are unable to stand up to rapid cross country journeys off roads such as must be considered almost the normal method of progression of an Armoured Division.

The maintenance of vehicles is of added importance in a Light Field Ambulance owing to the terrain it crosses. The Transport Officer, his Warrant Officer and fitters are very fully employed. The unit cannot afford vehicle failures or casualties either in load-carrying vehicles or ambulance cars. Commanding Officers should exercise as much supervision over transport matters as they do over purely medical work.

(3) TACTICAL EMPLOYMENT OF THE LIGHT FIELD AMBULANCE.

For administration, the Light Field Ambulance of an Armoured Division may be placed (i) under command of the Brigade which it serves or (ii) under command of the A.D.M.S. of the Division.

The normal practice is for Light Field Ambulances to be brigaded during a battle period and revert to command A.D.M.S. when not engaged. It is a matter of some considerable advantage, and universal practice in this Division, however, to retain the Headquarters of one Light Field Ambulance under command

A.D.M.S. during the battle period as he can then form a rearward Main Dressing Station on a divisional basis. In recent months it has been found most advantageous to retain command of the Field Ambulance serving the Lorried Infantry Brigade for this purpose whilst the Sections (or Company) at Brigade Headquarters remain under command of that Formation.

This procedure has been found to be of additional benefit when a Field Surgical Unit is attached as, under these circumstances, all the surgery within the Division is concentrated in this one Main Dressing Station which has been sited as an invariable rule at a distance of some three miles behind Rear Divisional Headquarters on the rearward axis. Whenever possible an Advanced Blood Bank—distributing whole blood and plasma on a divisional basis—has also been sited with this Field Ambulance.

Sections of the Light Field Ambulance have been distributed and detailed for duty in accordance with the following scheme :—

“ A ” Section.—Area of Brigade Headquarters.

“ B ” Section.—at “ B ” Echelon Area.

“ C ” Section.—at M.D.S.—or with “ A ” Section and prepared to “ leap frog.”

“ D ” Section.—at M.D.S.—to undertake resuscitation and to perform—in co-operation with the Field Surgical Unit—rearward staging.

“ A ” Section with Brigade Headquarters moves with that Formation at all times. It must be prepared to pack and be ready to move at ten minutes' notice. It will normally have a pool of some six ambulance cars—with a further car attached to each regiment—whilst, in the Armoured Brigade, a further pool of three cars is held by the R.M.O. of the motor regiment.

If it is ordered to move before it has been able to clear its casualties, “ C ” Section will take the place of “ A ” Section with Brigade Headquarters.

“ B ” Section is located and moves with “ B ” Echelon replenishment vehicles. It is essential to provide adequate medical arrangements in this area owing to its vulnerability to aerial attack apart from the routine medical care of the large number of men involved in the replenishment of the Brigade with petrol, oil, ammunition and rations.

“ C ” Section—the spare section—is normally located with the M.D.S. but moves to “ A ” Section when necessary to “ leap frog ” or when heavy casualties are anticipated.

“ D ” Section—normally attached to the M.D.S.—carries out resuscitations but is responsible for rearward staging when the M.D.S. moves and yet must leave patients on the ground.

In the case of the Light Field Ambulance attached to a Motor or a Lorried Infantry Brigade, it is the practice to have both “ A ” and “ C ” Sections permanently attached to Brigade Headquarters, owing to the proportionately large numbers of casualties that may be anticipated. This, it is recognized, is not an ideal. What in actuality appears to be required is an establishment more com-

prehensive than the two sections of a Light Field Ambulance yet somewhat less than a full company of a Heavy Field Ambulance as at present constituted.

Experience has shown that, during the course of the battle, it is necessary for either the Officer Commanding the Light Field Ambulance—or his second in command—to be forward at the Section with Brigade Headquarters in order to be fully cognizant of the Brigade Commander's intentions and so conform at the earliest moment. It will be readily appreciated that here he is in contact also with the regimental medical officers and the Advanced Dressing Station and is thus in a position to visualize the whole medical picture of the Brigade front whereas, at the Main Dressing Station some miles away, he is somewhat at a disadvantage. Further, if he is situated forward, he is in touch with the D.A.D.M.S. who will acquaint him with the state of affairs on the Divisional front.

It is a matter of choice for the Officer Commanding whether he himself proceeds to Brigade Headquarters or deposes his second in command but it is in many ways more satisfactory if he is there himself, leaving the management and running of the M.D.S. to his deputy, as the unit headquarters is at all times in direct wireless communication with (i) A.D.M.S. on the medical link, and (ii) with Main Brigade Headquarters *via* the Brigade Q Link.

(4) EVACUATION OF CASUALTIES.

Normal practice is, as stated earlier, for one ambulance car to be attached to each regiment or equivalent unit and for the A.D.S. at Brigade Headquarters to maintain a pool of cars—with a small forward pool at the R.A.P. of the Motor Battalion in the case of the Armoured Brigade.

This means that at any time five cars will be with regiments—including the Artillery—three will be with the forward car post and six with the Brigade Section functioning as the A.D.S.—a total of fourteen cars. The remaining cars are employed ferrying between the A.D.S. and the M.D.S. (less cars detached to "B" Echelon, Divisional Headquarters, etc.) in conjunction with the six cars above mentioned.

Evacuation in a Motor or Lorried Infantry Brigade or in a Light Armoured Brigade is on the same general basis.

Evacuation rearward from the M.D.S. is effected in the normal manner by cars of the Corps Motor Ambulance Convoy.

A feature in the rearward evacuation of casualties in recent months, that has become extremely prominent and of tremendous advantage to the patient, is the employment of returning empty transport planes to evacuate sick and wounded from landing grounds sited relatively forward in the theatre of operations to base airfields and General Hospitals. No words can express the revolution this has caused in the early and full treatment of cases of all types.

Additionally, for special and particularly urgent types of case, air ambulances may be requested and will be arranged by D.D.M.S., Army, in conjunction with Advanced Air Headquarters. These planes operate from advanced fighter aerodromes or from specially prepared medical landing strips adjacent to a

M.D.S. These ambulance planes, operating from special landing strips, are of inestimable value in the evacuation of casualties from an Armoured Division operating on a wide outflanking movement and moving as a self-contained force without lines of communication established in the earlier phases.

(5) DIVISIONAL MEDICAL ADMINISTRATION.

It has been the practice in this Division for the A.D.M.S. to be sited at Rear Divisional Headquarters with the other Heads of Services and to control the working of the Medical Services from this point. Especially has he supervised the siting and functioning of the rearward divisional links in the chain of evacuation, whilst his D.A.D.M.S., sited at Main Headquarters, has confined himself to the work of the Regimental Medical Officers and the Sections of Light Field Ambulances working at Brigade Headquarters.

This arrangement and division of duties in the battle period has many advantages and ensures that, whilst the A.D.M.S. is fully informed of the situation through A/Q sources, he also has direct information from his D.A.D.M.S. of the rapid changes and exploitation of the situation so characteristic of the successful employment of an Armoured Division.

The help of the "G" staff in this respect is most valuable and, through the collaboration of the GIII (I), the D.A.D.M.S. is at all times in a position to listen to the Divisional Forward Control W/T or to peruse the messages that come in whilst he is engaged elsewhere in the forward zone. Finally he is completely informed of the enemy movements and dispositions as well as those of flanking Formations. Early instruction of such knowledge to the A.D.M.S. allows the latter to anticipate future requirements and make his preparations accordingly.

It is appreciated that this custom is not universal practice in other Armoured Formations but it is considered to offer the most workable and efficient all round solution to ensure that the Medical Services work as a team fully cognizant of the Divisional situation as a whole.

(6) COMMUNICATION.

A moment's reflection will show the importance that wireless communication plays in the Medical Services of an Armoured Division and how the A.D.M.S. is at all times in communication with his field ambulances and, rearwards, by an hourly "flick" to the Corps medical frequency, with the D.D.M.S.

R.M.O.s in a case of extreme urgency are in a position to contact the A.D.S. at Brigade Headquarters by a message sent over the regimental link to the Brigade Forward Control whilst the Section or Sections at Brigade Headquarters are in communication with the M.D.S. of the Light Field Ambulance through the Brigade "Q" Link, on which frequency the Field Ambulance W/T set also works.

Communication from Rear to Main Divisional Headquarters is as far as circumstances permit by line telephony but, where circumstances do not permit, e.g. on the move, a "Q" Link W/T set opens at Main Headquarters through which the A.D.M.S. and D.A.D.M.S. are in communication.

On present establishments there is no specific wireless set on the D.A.D.M.S.'s

vehicle which would allow him to communicate with his A.D.M.S. on the medical frequency wherever he may be. It is considered to be a most useful and valuable requirement which has much to recommend it.

The normal method of communication from R.M.O. to A.D.S. is by written message sent by a returning ambulance car, the use of the regimental wireless link to Brigade being restricted to matters of extreme urgency owing to the normal operational congestion of this link under battle conditions. In the same way less urgent messages from the A.D.S. to the M.D.S. may be conveyed in this manner.

A D.R. service throughout the medical units of the division can be most successfully arranged by the utilization of ambulance cars as they perform their normal duties.

No method of communication is however foolproof and, where long messages relative to future operations are necessary, it is often most satisfactory to employ an officer as Liaison Officer. This officer is extremely valuable not only for maintaining contact between Sections of the Light Field Ambulance and the M.D.S. but also with the A.D.M.S.

(7) THE FIELD HYGIENE SECTION.

The employment of the Divisional Hygiene Section in an Armoured Division is strictly comparable to that obtaining in less mobile formations, attachments of personnel being made to Brigades whilst the main body of the unit is attached to the rearward Light Field Ambulance. It has been found advantageous for the O.C. Hygiene Section himself to be located at Rear Divisional Headquarters where he is in a position to direct his unit to fullest advantage and is also immediately available for such other duties as the A.D.M.S. may require.

CONCLUSION.

A brief summary of the conditions obtaining in an Armoured Division relative to its Medical Services is given and an attempt has been made to show how **this** organization adapts itself to the constantly changing and very mobile conditions that are met with in mechanized warfare.

DIPHTHERIA—THE “BULL NECK” HYPERTOXIC TYPE. A MIXED INFECTION.

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THE cases of diphtheria shown to be a one-organism infection of the Klebs-Loeffler bacillus, whether the tonsils and fauces, the pharynx, the larynx, or the nose are the primary site of infection, no longer constitute the bogey to the medical profession, as they did about half a century ago.

The great change follows the progressive strides made by medical science during late years :—

(1) By the introduction of serum therapy and, more especially, by the still later method of employing the intravenous route, together with intravenous glucose with or without the requisite dose of insulin.

(2) By the equally valuable improvement in bacteriological technique, making possible an earlier diagnosis, by the staining of the organism in direct smears, by the employment of media for culture (Loeffler's blood serum or Hoyle's laked blood tellurite agar), by the sugar fermentation tests and, lastly, by using the guinea-pig for testing the virulence of the organism.

(3) By the use of the Schick test for susceptibility and the ensuing immunization of those showing a Schick-positive reaction and the general immunization of all young children without any preliminary Schick test.

Diphtheria has thus lost its scare—in fact one is relieved of all fear of the disease—and there is little or no cause why any case should be lost, given that the diagnosis is made within the first two or three days.

In these “true-bill” diphtherias, the clinical diagnosis presents little or no difficulty and it is almost constantly backed by the bacteriological findings.

This happy state of affairs does not exist, however, in cases in which there is a *mixed* infection, that is where, in addition to the presence of the Klebs-Loeffler bacillus, there are other organisms whose mere presence blots out from view the reasons, clinical and bacteriological, for appreciating the existence of the diphtheria bacillus as a causal agent in the case.

It is in these *mixed infections* that we are still truly up against it, and the reason for it is the great difficulty in arriving at the correct early diagnosis. In this type of case there is often absolutely nothing to lead one to suspect the presence of the diphtheria organism. In fact, the therapeutic test may be the only real proof that the case is diphtheria.

The organisms that generally appear in the laboratory reports are (1) The *Streptococcus hemolyticus*, at times giving a pure culture ; (2) The *staphylococcus* ; (3) The *pneumococcus* ; (4) The *Micrococcus catarrhalis* ; and (5) Vincent's organisms.

The throat is nearly always negative to the Klebs-Loeffler bacillus in the first swab and, in many cases, throughout the whole of the disease.

In some cases there is no membrane present or at any rate visible.

The most frequent errors made in diagnosis are mumps, quinsy, follicular or ulcerative tonsillitis or merely "sore throat," syphilitic ulceration, Ludwig's angina, Vincent's angina or scarlet fever, which may indeed co-exist and present a bull-neck appearance.

In these cases it is essential to realize that the time factor is everything in saving life, by the early administration of antitoxin. Every hour counts and consequently one does not wait for confirmation by the Schick test or the laboratory report. In any case, the Schick test will be negative if performed after antitoxin has been given. The diagnosis often must be on purely clinical grounds and the correct procedure undoubtedly is to administer the antitoxin and accept the lesser of two evils. Confirm the diagnosis later by taking nasal and throat swabs but treat the case first.

THE CLINICAL PICTURE OF "BULL-NECK" HYPERTOXIC DIPHTHERIA.

The patient complains of sore throat and difficulty in swallowing, so different from the case of pure diphtheria, neither has he the languid and apathetic expression and toxic appearance of the latter. On the contrary, his face is flushed and suggestive of fever, he is probably perspiring and has some dyspnoea and dysphagia and he has a foetid breath to the point of being extremely putrid and offensive. This is very characteristic. The lips may be cracked and dry, with herpes and, possibly, a sanious nasal discharge with blood-stained saliva trickling from the mouth. This latter is not by any means constant.

The title "Bull-Neck" truthfully describes the anatomical picture as it closely resembles the neck of the bull. There is a hard, tense swelling of the neck, obliterating the normal outlines, stretching from the angle of the jaw downwards on one or both sides. This is due to a cellulitis of the tissues of the neck and, once seen, is not forgotten. It has a distinctly different feel from an ordinary cervical adenitis, that of laying one's hand on a billiard ball with no sense of fluctuation or elasticity. Together with this, cellulitis is frequently present, a definite quinsy or peritonsillar abscess. With it all, one may be able to appreciate a swelling of the submaxillary glands, those at the angle of the jaw or those of the anterior cervical group.

On looking into the mouth, which can only be partially opened and that with difficulty and pain, the oropharynx is brightly injected, the tongue is of the streptococcal type, i.e. scarlet red and possibly fissured, denoting a very acute inflammation, with œdema of the soft palate and uvula. In fact, the whole of the mouth and pharynx displays a condition of catarrhal congestion so intense that one wonders how the patient can breathe or swallow; and one considers the possibility of a tracheotomy at a later date. The patient is frightened that he will choke and he should be reassured that this cannot happen and that he will feel much better when the "abscess" breaks. The use of a scalpel or bistoury is not indicated. The fauces and tonsils may be spotted and patchy but a definite

area of membrane is seldom visible. The temperature ranges from 101° to 104° F., the pulse is rapid, from 110 to 120 or more, and it is generally soft at the wrist. There will nearly always be albumin in the urine—from a mere trace to complete solidity on boiling. There is no hæmaturia and the kidney condition may clear up in a few days.

Here we have a picture of this type of mixed infection seen in the early days. If not diagnosed early, the patient's condition rapidly deteriorates and profound toxæmia ensues, with prostration and intense greyness and toxic appearance and lethargy with possibly purpuric hæmorrhages on the trunk and limbs, and death takes place from cardiac failure in about six days. If seen late, the patient does not react to even large doses of antitoxin introduced by any route.

There have been ten such cases admitted to this hospital, nine of which were, in the first instance, wrongly diagnosed, and it is submitted that an abridged analysis of these cases might with advantage show some of the difficulties met with in establishing an early diagnosis.

HISTORY BEFORE ADMISSION OF THE 10 CASES ENUMERATED.

(1) Treated for six days with sulphanilamide for "sore throat." Laboratory report on throat swabs negative for K.L.B., Vincent's and hæmolytic streptococci.

(2) Treated for tonsillitis for five days.

(3) History of "sore throat and general weakness" for two days.

(4) Diagnosed as ? diphtheria and sent to hospital immediately.

(5) Originally diagnosed as ulcerative tonsillitis and later as "mumps" and later still as diphtheria and given 8,000 units of antitoxin before admission.

(6) History of quinsy, having ruptured on day previous. But as there was no improvement in the general condition he was sent to hospital.

(7) Sent to Sick Bay for one and a half days with swollen glands, then diagnosed as "quinsy" and sent to this hospital as "MUMPS."

(8) Had been in contact with a case of diphtheria and diagnosed as diphtheria, and 8,000 units of antitoxin given before admission.

(9) Diagnosed as tonsillitis and Vincent's angina and treated with sulphanilamide.

(10) A soldier's child, aged 5, diagnosed as "mumps," but medical man not called in for over a fortnight. Her throat swab was reported as strongly positive K.L.B. and hæmolytic streptococcus. She was admitted to hospital and died the next day.

LABORATORY REPORTS ON THROAT SWABS.

The first swab was negative in nine out of the ten cases and, in eight of the ten cases, was negative throughout the disease. In one case morphological K.L.B. was isolated on the third day and in another not until the fourteenth day though six swabs were sent and all previous reports were negative for K.L.B., Vincent's and hæmolytic streptococci. The organisms most commonly reported as present were Vincent's and hæmolytic streptococci.

Fætid Breath.—Diagnostic in sever. cases.

Temperature.—Raised from 100° to 104° in all cases but one in which the temperature was normal throughout.

Contour of Neck.—All cases possessed the " Bull-Neck " outline.

Quinsy.—Present in six cases.

Membrane.—Definitely present in five cases ; others had a mucopurulent exudate on one or both tonsils.

Blood Picture.—Not constant ; but those in which a differential blood count was done showed a polymorphonuclear leucocytosis.

Generalization.—100 per cent had the " bull-neck " appearance due to cellulitis with or without quinsy. 70 per cent had the diagnostic unforgettable fœtor of breath. 90 per cent had a temperature of 100° and over.

DIFFERENTIAL DIAGNOSIS.

Vincent's Angina.—The direct swab shows the fusiform bacilli with a motile spirillum. Further, there is nearly always present an extensive ulceration of the gums with a purulent discharge.

Mumps.—In " bull-neck " diphtheria the parotid is not involved and even the sub-maxillary type of mumps is easily distinguishable.

Quinsy.—Very frequently present but, in addition, there is the extensive cellulitis, the fœtid breath and the " bull-neck " appearance.

Follicular Tonsillitis.—The area infected is much beyond what is present in a case of tonsillitis. In addition, there is the diagnostic breath, the cellulitis and general engorgement of the throat.

Retro-pharyngeal Abscess.—The site of this is generally diagnostic by its position, in which it forces forward the posterior pharyngeal wall, " blocking up " the throat. Further, fluctuation is easily recognized by examining the posterior wall of the pharynx with the finger.

Scarlet Fever.—The history of vomiting, the rash and red strawberry tongue, which may have begun to peel, and the angry redness of the whole of the fauces in early scarlet fever are diagnostic, and the absence of the fœtor in diphtheria is helpful.

Ludwig's Angina.—There are many similarities in these two infections but angina ludovici is a very severe septic inflammation giving rise to a temperature of 105° or 106°. It is a streptococcal infection of an extreme degree of virulence, in which death may result from asphyxia within twenty-four hours of the onset of the disease. There is absent the diagnostic fœtor.

Syphilitic Ulcerations.—These are generally situated well forward and even on the hard palate. There may be a history of syphilis. The case does not react to anti-diphtheritic serum but reacts to mercury and iodide.

Tubercular Ulceration.—There is a chronic history and probably tuberculosis is found elsewhere.

TREATMENT OF THE MIXED INFECTION.

The most morbid element being the Klebs-Loeffler bacillus, the patient should be transferred without delay to an isolation hospital.

The following recommended treatment is as carried out in this hospital :—

- (1) If an Army case, put on the Dangerously Ill List and notify the disease.
- (2) Put the patient recumbent and block the foot of the bed.
- (3) Take a nose and throat swab.
- (4) Give 12,000 units of diphtheria antitoxin intravenously. Give it slowly and watch the reaction.
- (5) Give 50,000 to 100,000 units of antitoxin intramuscularly, the dose depending on (a) the condition of patient and extent of membrane, if present, and (b) length of time since commencement of illness.
- (6) Give 40 to 60 c.c. of 40 to 50 per cent glucose intravenously. The equivalent amount of insulin may be given ; but latterly it has been considered unnecessary and without advantage.
- (7) Order glucose by the mouth *ad lib* up to 5 oz. daily.
- (8) If there is a quinsy or much cellulitis, order a linseed meal or kaolin poultice to be repeated six-hourly.
- (9) In ordinary nursing activities the mouth will be kept clean and freed of exudate.
- (10) (4), (5) and (6) may have to be repeated the next and even the third day.
- (11) A good method to follow after the third or fourth day is to give a morning and afternoon intramuscular injection of 24,000 units of antitoxin until all membrane is separated, if present, or until the patient's temperature is normal and the process of intoxication has obviously come to an end.
- (12) If the Laboratory reports the presence of hæmolytic streptococci in any number, give 3,000 units of concentrated anti-streptococcal (hæmolytic) serum intramuscularly and repeat the next day.
- (13) If Vincent's organisms are reported, paint the throat twice daily with 2 per cent chromic acid followed by a peroxide mouth-wash.

The amount of antitoxin given to the ten cases analysed :—

Case		Units intravenously	Units intramuscularly
1	.. ..	24,000	72,000
2	.. ..	48,000	74,000
3	.. ..	24,000	300,000
4	.. ..	—	128,000
5	.. ..	24,000	234,000
6	.. ..	32,000	112,000
7	.. ..	—	202,000
8	.. ..	—	200,000
9	.. ..	12,000	86,000
10	.. ..	—	36,000

PROGNOSIS.

In the days before the introduction of antitoxin therapy the mortality ranged from 25 to 40 or 45 per cent and the figure for the hypertoxic variety, was, and

still is, given as 50 per cent. To-day, a fair estimate of straightforward diphtheria cases would be a mortality rate of from 3 to 10 per cent.

In this Hospital there have been admitted 239 cases of diphtheria since the outbreak of war and of these four died, which gives a mortality rate of 1.6 per cent of all cases. Out of the ten cases analysed, two died (included in the above-mentioned four deaths) giving a mortality figure of 20 per cent. The two cases who died were those numbered 1 and 10.

It is a logical deduction that the cause of the great difference of the mortality figures between the true diphtheria cases and the "bull-neck" mixed infection must be the great difficulty in establishing an early diagnosis in the type of case analysed above.

The bacteriological work was done by the Assistant Directors of Pathology of this Command and I would render thanks for their unfailing co-operation at all times. They are Lieutenant-Colonel Little, *O.B.E.*, and Lieutenant-Colonel M. T. Whitehead, *M.C.*

Apart from the serum treatment, the general management of the case by the Nursing Staff influences the prognosis immensely and I do with great pleasure pay tribute to the excellent and untiring care bestowed on every patient by the Nursing Members of *Q.A.I.M.N.S.* and *Q.A.I.M.N.S.(R)*.

AN ACCOUNT OF AN IMPROVISED C.C.S. FROM ITS INCEPTION AT OFFRANVILLE TO ITS CLOSURE AT RENNES.

BY BRIGADIER R. OGIER WARD, D.S.O., O.B.E., M.C.

OFFRANVILLE is a small village about seven miles S.E. of Dieppe. Nos. 2 (Colonel T. S. Blackwell) and 3 (Colonel A. L. Foster) General Hospitals were placed outside it. No. 2 was largely in huts, No. 3 entirely in tents. No. 1 General Hospital was in the Casino at the south end of the esplanade of Dieppe and three other general hospitals and a convalescent camp were in the neighbouring countryside. In Dieppe was a medical sub-base commanded by Colonel Gordon Wilson. Upon him fell all the heavy responsibilities of the succeeding days. These included the steps to clear the patients, staffs and equipment of the general hospitals and the large amount of medical stores in the depot as well as the consideration of measures for local defence, though these were organized by the combatant services. The C.C.S. remained under the orders of Colonel Gordon Wilson until it moved south of the Seine. It then came under the orders of A.D.M.S. Rouen sub-area and later on under the control of L. of C. formations. Active war in the West began on May 10. The enemy first paid attention to the Dieppe area by a bombing raid on May 18, and again on May 19. On that day No. 1 General Hospital began to clear its cases. On May 21 it was again raided and the hospital carrier *Maid of Kent* lying in an inner basin of the harbour was set on fire. Another raid on the town occurred on May 24. All the hospitals were clearly marked with the Red Cross in large pattern on the nearby ground and none was bombed. But the hospital carriers were also clearly marked and two were destroyed in daylight raids. At Offranville we could see the aeroplane diving on to the harbour and the bombs, as they were released from them, and certainly the markings on the ships must have been clearly visible. Dieppe at that time had no anti-aircraft defences and the planes were able to come as low as they wished. With Colonel Gordon Wilson I visited the harbour shortly after several of these raids. An hour after one of them the remains of the *Maid of Kent* were a hot mass of metal above the partly-submerged hulk. Some trucks of the ambulance train on the quay close by were still smouldering having been burnt down to the floor level. The loss of life had fortunately been slight. Only a few were on board the ship when it was hit and I think all got out. The train was only partly loaded at the time and the burning coaches were quickly detached so that it was able to move off. It contained some patients and sisters besides its usual staff. Although some houses were destroyed the actual damage done to the town was not great.

The salvage operations of hospitals and stores which were initiated and controlled by Colonel Gordon Wilson were extremely successful. Almost the entire equipment of six general hospitals was loaded on to trains and lorries and sent south in the course of a very few days. To many who were engaged in the work the immense capacity of a railway truck came as a surprise. It was a great

achievement and the ultimate loss of all the stores to the enemy should not be too deeply deplored. The fact that the British Army made no attempt to embark its stores, though some part of these could no doubt have been saved, is a testimony to the fact that Britain was always ready to carry on the fight had France been so determined.

I think it was on May 20 that a field adjoining No. 3 General Hospital accidentally became an aerodrome. One of our fighters crossing to France was attacked by a German plane which the pilot shot down into the sea. This drove him off his course and he landed close to us and we were glad to give him a meal. Soon after his arrival the planes of a French squadron which had been driven from their aerodrome saw his plane on the ground and decided that here was a landing ground. One by one they came down and presently there must have been ten medium bombers there. The field was only rough grass and the commander asked for help to find an aerodrome which his map clearly showed to be about ten miles further south. I took him there in my little 8 h.p. Simca, a decrepit but worthy vehicle which was to prove so valuable to me in the days that followed. We found the place easily enough though the local gendarmerie were very vague about it; a wide expanse of level ploughed field. A small notice board proclaimed that it was reserved for military purposes but the village policeman whom we caught bicycling back to his lunch assured us that it was an aerodrome but, he added, it was not to be ready until the summer of 1941.

During these days a considerable number of cars containing Belgian staff officers passed through Dieppe, this making one realise how serious was the situation in the north. Presumably they were members of the government and war departments. Many civilian refugees passed through Dieppe and thousands more were seen during the next fortnight. It was a tragic sight. In 1912 I was a surgeon, actually only just qualified, in a British Red Cross Unit sent to Constantinople. Max Page was our only real surgeon. In those days Turkey was being driven back by Bulgaria, Serbia, Rumania and Greece. We saw the capital crammed with refugees and their transport from Macedonia and Thrace. We saw them bivouacked in the side streets for weeks and months, slowly degenerating, the oxen which were to draw their carts sold from lack of forage. They were waiting for space on the ferry to cross the Bosphorus to seek new homes in Asia. In 1918 I was in the March retreat of the Third Army and that was grim enough. But in Normandy during those last weeks the tragedy was deeper; a nation driven from its homes; the huge farmcart drawn by four high-crested horses crammed with household goods; the family walking and pulling hand carts, except perhaps the grandmother who sat on top of the load, dry-eyed but staring fixedly ahead. One felt that she had been through it all before but this time had no hope at all. Motor cars always had mattresses on top as a protection against machine-gun bullets. Sometimes being without petrol they were towed by the carts. The discipline was good, these people kept strictly to the right, rarely doubled the traffic except to avoid some abandoned motor car and, when halted, pulled clear. We saw these columns at Dieppe, we saw them on all the roads down to Alençon, but in the last days they were

gone and the countryside was emptied of them. Now the roads were cleared for the free movements of armies but only the German army made use of them. I passed through Rouen on June 2 and visited it again twice a few days later. The city was partially empty but those who remained were trying to carry on. A doctor upon whom I called was holding his private clinic much as usual but he had served in the last war and had no illusions about the future when he bade me farewell. Work was going on at all the bridges over the Seine which were being prepared for demolition and I suppose that later all were destroyed. I had been rather concerned lest our retreat from the Dieppe area might be interfered with by the early capture of Rouen and had considered using the ferry at Yvetot about twenty miles to the west but decided against that and I heard afterwards that it became so congested that parties had to wait two days to cross. It was in this corner that the 51st Division was afterwards trapped. The Seine seemed a fine defensive line but it was not held for long. Apparently the Germans quickly penetrated into its sinuosities and then effected crossings. No. 13 General Hospital was on the main road south of Rouen. The staff were very busy ; before they left, I think on June 9, they had some unpleasant bombing experiences.

Conches, about thirty-five miles south of Rouen, is a pleasant place with a large green in the middle of the village. Here is a pond in which the frogs make a tremendous din each evening. There are many trees round about it which gave admirable cover. The M.A.C. parked there with ours and many other vehicles. The River Iton flows through Conches and the Garde Champêtre in whose house I was billeted showed me where I could get some fine trout fishing. I did well on several evenings while we were waiting for orders to open up. But the fishing was not at its best for the stream was in places filled with French troops bathing and netting the fish. There were men who had been embarked from Dunkirk and were now going forward again. They seemed very short of vehicles and equipment. A day or two later they went back again and we were left in peace. The bombing of Conches was a curious episode for none of our troops saw any leaflets dropped from the aeroplane which passed over in the morning and I fancy the warning was a benevolent one in some way conveyed for the information of local fifth columnists. After we evacuated the village I paid two visits to it. It had sustained no further damage but was almost entirely uninhabited. Whilst at Conches I went several times in my Simca to the large town of Evreux. This was the headquarters of the Troisième Region. The Q staff were always polite but were obviously extremely depressed. Refugees were moving westwards through the town along the road to Conches. The local inhabitants were placid until after the first raid which was aimed at the railway station. I happened to be just outside the town at the time and saw a French plane trying unsuccessfully to intervene but the enemy dropped their bombs and then one saw the usual sad spectacle of women searching amongst the ruins of their cottages. The third raid was even more successful for the railway bridge over the road just outside the station (there are not many bridges in France) was hit and one track entirely demolished and, on my last visit to the town, I saw

that a train coming round a bend out of the cutting had just succeeded in pulling up short of the bridge. On that day Evreux was completely empty. I and my driver had it to ourselves.

When we arrived at Sees it was dark. I knew that a blackout was ordered but I could also see that many of the cars hurrying through the town had lights on. I wanted to study the exits from the place so turned on my headlights to examine my map. A French officer, a lieutenant, asked me brusquely what I was doing and, when my replies did not seem to satisfy him, told me to come to the police station. I did so and was submitted to a cross-examination by the gendarmerie. In contrast they were studiously polite and my limited French was just adequate to give the explanation which they required. It became more fluent when I told the lieutenant how much I resented his manner. Just as I was leaving my liaison officer, Captain Barbas, came in search of me and after some further parley between him and the gendarmerie we departed. When we got outside he told me that the lieutenant was deeply disappointed as he was sure that he had captured a parachutist. Sees was bombed later and so were all the surrounding towns and considerable damage was done for the solitary planes which came over were entirely unopposed either in the air or from the ground and could manœuvre just as they wished before dropping their bombs.

Bois Roussel was one of France's greatest stock breeding centres for race horses. When we left the Germans could not have been more than a day's march distant but exercise, grooming and mucking out continued as usual. The stud groom had sent away two of his stallions to the South of France, one remained and also all the brood mares, foals and fillies. His chief anxiety appeared to be not for himself and his family or for his staff of French and Irish grooms and their families but for the safety of his stud books. I remember how the Comtesse in whose house we were billeted came back one afternoon from a hurried visit to her husband who was on the general staff at Nantes. She told us with unfeigned grief and shame that they feared France would soon make a separate peace. Paris fell on June 14. All Captain Barbas' business interests and his hundred employées in the capital were involved. He had joined the artillery of the French Army in 1918 by juggling with his age, for he was only seventeen, and had been given the Croix de Guerre. He was a splendid officer and no one could have been more whole-heartedly out to win the war. Indeed I formed the opinion and strongly held to it that the people of France were willing to go on fighting. I did not see many troops and anyhow troops quickly lose confidence when, because staff arrangements break down, they are left without orders; but the civil population was full of spirit. The refugees were orderly and when during our final march from Bois Roussel to Rennes we came to any village we found the entrance to it strongly barricaded, the old men all on duty armed with shot guns. Their eyes lit up as they saw us; the British Army was at hand! Alas! it was not so and presently each of these villages, upon which in France the roads so characteristically converge and through which all traffic must pass, were to be abandoned by order and without a fight. Whilst at Bois Roussel I had made several journeys, either with Captain Barbas in his Citroen or in

my Simca, to the north or to the north-east. In the earlier days these villages were still in part occupied and one could easily make purchases at well-stocked groceries. Later the villages were completely empty. Telephone exchanges became silent, the inhabitants left everything and the life of the countryside died. It was a curious experience to move about in those days. The cattle remained unattended ; in the pastures, the farms and the fields were deserted ; for miles there was no one to be seen, no civilians, no soldiers and no enemy though one could not help wondering if an hostile armoured car might not swing round the corner. One felt secure when travelling north of the line from Conches to the coast for the British force covered that area, but there was an unpleasant feeling of exposure when more to the south for I had seen the French infantry retire through at Conches and it seemed likely that a wide gap existed ; though whether that was so or not I do not know. On one of these expeditions I found what I feel sure was a fifth columnist job. The Simca was following a country lane and we were approaching the main road between Laigle and Verneuil. About a mile from this another lane, running parallel to the main road, crossed ours at right angles. An enemy plane had just flown over this. When we came to the intersection of these lanes we found two large heaps of dried grass on the track ; one had burnt out, the other was still smoking. No one was to be seen, the countryside for miles round was utterly deserted. It must have been some signal and the man who lit it was doubtless hiding near-by. But I believe the great majority of the French people were loyal to the cause for which they had entered the war. When I said goodbye to Captain Barbas at Rennes on the morning of Sunday, June 16, we agreed that neither would judge the other's country until all the facts were known. I have kept to that promise and I do not doubt that he has done likewise.

On Monday, June 17, at a quarter to eight we landed at Southampton after an uneventful night voyage from St. Malo and presently a train bore us to the north. I went to sleep and woke up just as were passing through Oxford. It was about 3 p.m. After the station there are several college grounds close to the railway. On each of these cricket was in full swing, everyone in nice white flannels, everything just as it was when I was an undergraduate. I wonder if this is one of the reasons why we win wars.

THE BATTLE OF THE MARETH LINE.
AN ANALYSIS OF CASUALTIES BY TYPES AND CAUSES.

BY **LIEUTENANT-COLONEL R. JOHNSTON,**
Royal Army Medical Corps.

INTRODUCTION.

(1) *Military Situation.*—The Eighth Army was disposed in front of the Mareth Line and it was planned that a major attack should take place on the northern sector of this line on a one-Divisional front while an outflanking force went far to the west and north to threaten the enemy's rear in the Gabes Area.

The frontal attack took place against immensely strong prepared positions, on the night of March 20/21, 1943, and succeeded in crossing the Wadi Zigzaou and penetrating the enemy's defended Line.

On the evening of March 22, however, a strong enemy armoured counter-attack necessitated the withdrawal of the attacking troops to their former positions during the early morning of March 23. They had, nevertheless, succeeded in drawing a strong enemy force to the south, thus diverting opposition from the outflanking force, the success of whose action compelled the enemy to withdraw from the Mareth Line proper.

(2) *Medical Situation.*—It is comparatively rare for one M.D.S. to receive almost all the casualties occurring in an important action but the M.D.S. of one of the Divisional Field Ambulances (with a B.T.U. and F.S.U. attached), served by two A.D.S.s, received some 732 of 850 casualties evacuated to the C.C.S. area, from March 20-23 inclusive, and it has been possible, therefore, to categorize the types of wound and analyse the statistics obtained from a major battle.

Evacuation.—The distances between medical posts were as follows: (a) R.A.P.s to A.D.S.s, $\frac{1}{2}$ to $1\frac{1}{2}$ miles; (b) A.D.S.s to M.D.S. (one to one and a half hours' amb. run), 8 miles; (c) M.D.S. to C.C.S. area (two and a half to three hours' amb. run), 20 miles. The greater part of the evacuation took place over desert tracks before the road was reached halfway between the M.D.S. and C.C.S.

STATISTICS.

A.—*Classification of Wounds by Types.*

Walking Wounded (Number of Cases—269=37 per cent).—The proportion of walking and sitting wounded was smaller than had previously been encountered. During the battle of El Alamein the proportion of "walkers" to "lyers" passing through the Field Ambulance was approximately 1 to 1; in the Mareth battle the proportion was roughly 1 to 2.

The decrease in the incidence of lightly wounded, as compared to the proportion encountered in the war of 1914-18, is almost certainly due to the greater destructive power of modern weapons.

Lying Cases (Number—463=63 per cent).—The majority of these casualties showed multiple injuries and included among the more seriously wounded :—

	<i>Actual no. of cases</i>	<i>Per cent of 732 casualties</i>
Penetrating Abdominal Wounds	14	1.9
„ Chest „	31	4.2
„ Head „	8	1.1
Compound Fractures—Upper Limbs (Upper Arms, 32 ; Fore- arm, 11)	43	5.8
„ „ —Lower Limbs (Thigh, 13 ; Leg, 34) ..	47	6.4

The figures of penetrating chest wounds (4.2 per cent) and especially compound fractures of the humerus were markedly higher in this action than had previously been encountered.

Other causes of evacuation to the M.D.S. included :—

	<i>Actual no. of cases</i>	<i>Per cent of 732 casualties</i>
N.Y.D. " N "	29	6.8
Physical Exhaustion	21	
Incapacitating injuries not directly caused by enemy weapons (sprains, strains, etc.)	31	4.2
Concussion	7	1
Burns	11	1.5
Blast Injuries	6	1

Concerning the N.Y.D. " N " and P.E. cases, the troops in immediate contact with the enemy were under constant machine-gun, shell and mortar fire, almost without respite, for two and a half days.

Eight of the N.Y.D. " N " cases were R.T.U. on arrival at the M.D.S. They were not true N.Y.D. " N " cases but principally soldiers in their first action who were just badly frightened.

In armoured battles the incidence of burns, due to tanks and armoured cars being set on fire, is likely to be higher.

<i>Field Surgical Unit</i>	<i>Actual no. of cases</i>	<i>Per cent of 732 casualties</i>
Number of necessarily " immediate " operations performed	37	5

It is considered that the above figure of 37 may be taken as the maximum number of serious casualties which can be operated upon in an M.D.S. by one Surgical Team during a period of three days and it is felt that the figure of 5 per cent necessitating " immediate life-saving operation " in the forward area, is a reasonably accurate one under most conditions of modern warfare. It had been agreed between the Surgical Team and O/C. Unit that only the most urgent and imperative operations should be attempted in the M.D.S. and that cases which could be evacuated must proceed to the C.C.S. at the earliest possible moment.

<i>Blood Transfusion Unit</i>	<i>Actual no. of cases</i>	<i>Per cent of 732 casualties</i>
Number of patients requiring blood transfusion	56	7.6
190 pints of blood used, i.e. 3½ pints per patient.		

The above figure does not include patients who were resuscitated by other

means or only required plasma. The figure of $3\frac{1}{2}$ pints per patient appears to be high and may be attributed to the following causes :—

(a) The C.C.S. was but two and a half hours' ambulance car journey distant and only the very severe and badly-shocked cases were transfused in the M.D.S. Those able to stand the journey proceeded with minimum delay.

(b) The Surgical Team maintained a list of cases for life-saving operation and it was necessary, therefore, to resuscitate and maintain these cases at their "optimum" with blood until the surgeon could deal with them.

(c) The blood was available and it was on account of this fact that blood rather than plasma was used in many cases. Post-operatively some blood was given but glucose saline drips were extensively employed.

<i>Mortality</i>	<i>Actual no. of cases</i>	<i>Per cent of 732 casualties</i>
Died in or on way to Field Ambulance	20	2.7

B.—Classification of Wounds by Causes.

	<i>Actual no. of cases</i>	<i>Per cent of 732 casualties</i>
Shell wounds	297	40.6
Mine wounds	35	4.8
Gunshot wounds (S.A.A.)	186	25.4
Mortar bomb wounds	45	6.2
Bomb wounds (principally grenades)	31	4.2
Bayonet wound	1	.1
Unclassified wounds	29	3.9
All other causes of evacuation to M.D.S., including N.Y.D. "N," concussion, burns, blast, etc.	108	14.8

The low figure of 4.8 per cent shown under the heading "Mine Wounds" is felt to be due to the fact that many casualties caused by this weapon were almost immediately fatal while the figure of 25.4 per cent caused by S.A.A., as compared with the much higher figure of 40.6 per cent for wounds caused by shells, is indicative that many of the casualties were killed rather than wounded by the very intense machine-gun fire from all angles which was a feature of this battle.

C.—Expectation of Casualties.

In making the medical plan it is always extremely difficult to obtain from "A/Q" and "G" a firm estimate of expected casualties. It was possible after this battle, however, to obtain a reasonably accurate figure of the actual number of Divisional troops in immediate contact with the enemy.

This, in relation to the number of casualties received, has made it possible to arrive at a method of estimating the expectation of casualties which may prove of use in future operations of the same nature, viz :—

"A" Branch stated that approximately 4,000 Divisional Troops (Infantry, Sappers and Machine-Gunners) were in immediate contact with the enemy during the battle. Of this category, the M.D.S. received 500 cases, i.e. 12½ per cent of this force.

A further 250 cases were treated at the M.D.S. These included Divisional Gunners and extra Divisional supporting arms, i.e. Tanks, R.A.S.C., R.A.M.C., etc. Therefore, to the first expectation of casualties, 50 per cent must be added, i.e. number of casualties to be expected totals 750.

Method of Estimation of Casualties.—In brief, during a frontal attack on a strongly defended "line," just under 20 per cent of "A" Branch figure of attacking troops, i.e. infantry, sappers and machine-gunners, gives the total number of casualties which an M.D.S. will be expected to admit, treat and evacuate. Thus, the medical plan with the provision of blood and dressings, surgical teams, ambulance cars, etc., can be arranged accordingly.

SUMMARY.

(1) The casualties of a major battle passing through an M.D.S. are analysed by types and causes.

(2) A method of estimating the expectation of casualties, independent of the figure given by "A/Q" Branch, for this type of action, is propounded.

MAJOR ETHER.—A T.E.W.T. FOR SPECIALISTS.

BY CAPTAIN W. T. E. BLACKMORE,

Royal Army Medical Corps,

Assistant Instructor, Officers' Wing.—Depot R.A.M.C.

THE type of exercise to be described has been evolved with a dual object :—

(1) To show that a specialist officer may require to exercise a working knowledge of map-reading, field messages, field organization and tactics.

(2) To provide an exercise in these subjects which is of personal interest to the specialist concerned.

The specialist officer taking part in the normal form of medical T.E.W.T., conscious that he is unlikely to have an administrative or executive role in the field, can only have an academic interest in the exercise. He is playing with situations in which he is unlikely ever to find himself instead of training for situations which may occur. He may be interested in the game as a pastime ; on the other hand he may be bored.

The Major Ether type of exercise provides a series of situations in which the specialist, or any individual officer, may well find himself and therefore has the required personal atmosphere.

It is felt that it might be a useful addition to the training programme for medical and dental officers who are at present serving in static and semi-static medical units.

Object.—The aim of this T.E.W.T. is to provide as far as possible a series of situations in which the specialist might well be involved.

Rapid thinking and quick decisions form part of the everyday life of a doctor. As crises of all kinds, medical, surgical and obstetric, are dealt with frequently as a matter of course so, in this exercise, he is trained to apply the same speed of mental reaction to the various untoward events that occur in the T.E.W.T. and which may possibly occur in the forward areas of war zones.

This tactical exercise demands a working knowledge of map-reading, route reading, reading and writing of messages and, above all, the application of common sense and quick reasoned conclusions in dealing with the various problems.

It must be emphasized that the T.E.W.T. is in no way an advanced one. Only elementary knowledge is required by the student but it is the practical application of this knowledge that is the dominant instruction factor of the scheme.

It has been tried out on various occasions at a Depot R.A.M.C., with interesting results and, in general, cadres have been impressed with the practical value of the exercise with the rueful admission that the mistakes made were quite inexcusable.

Modus Operandi.—This is a " bus T.E.W.T." Students are paired off in syndicates and each is required in turn, and at any stage, to take over direction of the bus.

The directing syndicate occupy the seat immediately behind the driver, who

takes his route orders from them. The remaining syndicates are obliged to follow each stage very carefully as they may be called upon to take over at any stage in the proceedings in no particular order.

Meanwhile the instructor directs the progress of the scheme from the seat behind the syndicate in charge and, as Major Ether is required to report to various units in turn, he is regarded as the O/C of the unit in each case.

In the opening narrative syndicates are instructed that for the purpose of the exercise they are Major Ether, a specialist anaesthetist in a General Hospital, who has been posted for duty with a Mobile Surgical Unit and the scheme then proceeds by stages. At the same time they are warned to expect the unpleasant concomitants met with in forward areas (gas, air attack, fifth columnists, etc.) and the warning signals for gas and air attacks are explained.

Stage 1.—Posting orders to the Mobile Surgical Unit are given to the first syndicate in which Major Ether is told to report for further instructions to A.D.M.S. "Z" Armd. Division and location with map reference is supplied.

They then direct the bus to the spot and report for duty.

Stage 2.—Here Major Ether is interviewed, in the absence of the A.D.M.S., by a recently appointed D.A.D.M.S. who can give him little more information than that conveyed in a message from D.D.M.S. (Corps), which is shown to the syndicate. This is to the effect that Major Ether is to join a Mobile Surgical Unit (code name BABA) believed to be with the H.Q. "X" L. Fld. Ambulance; location supplied.

It is notable that at this point many officers are quite content to charge forward without troubling to elicit any further information.

Their attention having been drawn to this oversight they are given the approximate dispositions of the enemy and our own troops, divisional area and boundaries, with the traffic rules that have been enforced. The code names for the medical units of the Division are hung up in the bus for all to see.

The directing syndicate then directs the bus to the given location.

Stage 3.—Major Ether Reports to O/C, "X" L. Fld. Ambulance, and is informed that BABA has gone forward to work with an A.D.S. and is supplied with their last known location with map reference.

Stage 4.—*En route* the syndicate is told that the area through which they are passing has been heavily gassed and that respirators must be worn for the remainder of the journey.

On reporting at the A.D.S. Major Ether learns that BABA has gone on to another A.D.S.—location supplied.

Stage 5.—On arrival here he is told by a particularly nonchalant O/C, A.D.S., that BABA has gone on somewhere, that he does not know where and has not the slightest idea as to how Major Ether is to find out.

The appropriate course of action is here discussed; the leading syndicate is given a message pad, told to write a message of inquiry and given the following one in reply:—

To. LOLA at MILO.

From. DADA.

Major Ether to proceed forward. Locate and join BABA forthwith.

The location of the nearest A.D.S. is supplied by O/C, A.D.S.

Stage 6.—During this part of the journey the air raid alarm is sounded.

The driver of the bus is told by the instructor to choose a suitable area for this purpose, preferably high open ground with adequate cover ; the bus is pulled up and the air raid alarm sounded by the bus klaxon.

The instructor showing the way, everyone goes to ground as quickly as possible. A tour is then made when site selection and posture are criticized and officers who have decided to " take a chance " and remain in their seats together with those who have taken cover under or near the vehicle are written off as casualties.

On arrival here the O/C, A.D.S., informs Major Ether that BABA is not with his unit, that it has gone on and, while he has no definite information, he rather believes that it is at Point " B."

As Point " B " is inside enemy territory, syndicates who elect to proceed are taken forward a mile or so and then informed that they have been shot up, their truck and kit destroyed, and that they are required to walk back to the A.D.S.

Officers who are alert enough to demand confirmatory evidence of BABA'S location are given a new one, this time that of a M.D.S. in the flanking Div. Area.

Stage 7.—On reaching a suitable cross-roads Major Ether is told that he has been stopped by a uniformed C.M.P. who, after enquiring his destination and asking Major Ether to show his A.B. 64, informs him that the road he proposes to take has been put out of action and supplies an alternative route, one which, incidentally, takes Major Ether into the enemy lines.

Officers who neglect to question this C.M.P. and satisfy themselves as to his " bona fides " (he is, of course, a Fifth Columnist) are written off as walking casualties and a mile walk back is ordered.

It is worth while pointing out that in order to impress this danger on their minds they are told the reason for the walk back after the march has been completed and not before.

Stage 8.—O/C " N " Fld. Amb. regards Major Ether with grave suspicion, tells him that he has never heard of BABA and requires evidence of Major Ether's identity.

His papers having been scrutinized, information is then given that BABA is at a M.D.S. some miles back—location supplied.

Stage 9.—On arrival here, Major Ether, tired but triumphant, at last locates BABA, only to find that the personnel know nothing about him, that they already have an anæsthetist anyway, that someone must have blundered, but that they will inquire what is to become of him.

He is then handed the following message instructing him to report to Corps H.Q. (original startpoint) without delay :—

To. JARO. BABA.

From. DADA.

MAJOR ETHER TO REPORT TO TITI FORTHWITH.

I am indebted to Lieutenant-Colonel T. P. Buist, R.A.M.C., for his valuable assistance in editing this article and to the Commandant — Depot, R.A.M.C. for permission to forward it for publication.

Editorial.

PHYSICAL DEVELOPMENT CENTRES.

THE attainment of good physique has always appealed to a certain minority, but, for the majority, the popularity of the appeal has varied considerably through the ages.

Since the attainment of good physique is achieved only by strenuous effort and industrious application it follows that the motive force energizing the effort and maintaining it must be a strong and compelling one. Not only must it stimulate *positive* effort to achieve and maintain but also that moral stamina to *negative* the appeals of luxury and ease which are so deeply rooted.

The search after physical perfection was never more earnest than among the ancient Greeks where the motive force was basically religious.

At other times and in other civilizations the driving force has been a combatant or military one. This may have been the appreciation of the importance of good physique as a factor in self-preservation or the more recent conception of good physique as an essential factor in successful aggression. In either case the motive force is a powerful one, self-preservation being linked with fear and aggression with lust for power and wealth.

It is during war that these two motive forces are unleashed generally and, under their impetus, the attainment of good physique on the part of the individual becomes of paramount importance as a part of the general mobilization of manpower.

The Army has always stressed the importance of good physique and in peacetime has been in the position of being able to choose to a large extent the material on which it would work. In war-time, however, the problem is quite different and it becomes essential to utilise to the full all available material. The production of good physique from the varied types available becomes a difficult and more technical problem.

During the Great War, 1914-18, we find attempts being made to improve the physique of lower category men by the formation of "Recruits Distribution Battalions," one of the functions of which was to train lower category men in the hope of up-grading them after a three months' course of physical training.

In May, 1937, No. 1 R.P.D.D. (Recruits Physical Development Depot) was formed at Aldershot in connexion with the Army School of Physical Training. The object was to give a course of pre-Service training to certain men who had been rejected for service on account of not reaching the required medical standards, chiefly in regard to weight. The results of training were so satisfactory that No. 1 R.P.D.D. moved to Canterbury in November, 1937, and No. 2 R.P.D.D. was formed at Scarborough.

In the present war we have been faced with the urgency of mobilizing all our

available reserves and in 1941 the first of the new Physical Development Centres was formed.

Its function was to make A 1 material out of men who had been placed in Categories A 2, B 1 and B 2. Physical Medicine Specialists in Commands were called upon to select such of these men whom they considered remediable and who were not more than 30 years of age.

Men selected were sent to the P.D.C. (Physical Development Centre) for a two months' course of training. The Centre could deal with 500 men every two months and the programme of work consisted of carefully graduated physical training of general type combined with more specialized remedial physical training directed to the particular disability from which the man was suffering.

Under the supervision of a Specialist in Physical Medicine the men were grouped in classes according to disabilities and A.P.T.C. instructors specially trained in remedial P.T. carried out specially graduated exercises. It was possible to give a considerable degree of personal supervision to the trainees and, in addition, facilities were available for the individual treatment of different conditions by chiropody, massage, electricity and resisted exercises by the pulley and weight system of muscle re-education.

It was recognized that *complete* success could be obtained only by complete rehabilitation. The object in view was not merely the restoration of the man's disability but the production of an individual who was adjusted both mentally and physically. To this end talks, lectures, education and debate were introduced into the programme. Such periods carefully spaced between the periods of more active military and physical training served the double purpose of providing mental stimulus and encouragement along with physical rest and relaxation.

Careful supervision of meals and a personal interest in the man shown during off-duty time created an atmosphere such as is found in any unit of high morale and was removed as far as possible from the hospital or treatment centre environment.

The final up-grading depended on a man passing certain functional efficiency tests of marching, running, etc., so that his final category was assessed on function.

The results were so successful, showing an average of 75 per cent of men up-graded to A 1, that in May, 1942, a second 500-P.D.C. was opened followed by a 1,500-P.D.C. in May, 1943.

The problem dealt with underwent a slight modification with the institution of the General Service Corps in 1942. It was found that many of the recruits presenting themselves at Primary Training Centres were under-nourished and under-developed.

They were of the A 1-minus type, i.e. potentially A 1 and suffering from no definite defects but liable to break down under routine training unless such training were very carefully supervised and graduated.

Physical Development Centres provided excellent graduated training facilities for these men where their physique could be improved under ideal conditions. This type of case has responded most successfully to this type of training and the results are most encouraging to all concerned.

Fifty per cent of the vacancies at P.D.C.s are available for this type of case from Primary Training Centres. Of the remaining 50 per cent of vacancies, 25 per cent are for men of medical categories A 2, B 1 and B 2 from Primary Training Centres and the remaining 25 per cent for similar category men from Field Force units.

Up to quite recently men were selected from Primary Training Centres during the first fortnight of their entrance into the Army but now it has been agreed that men may be selected from any stage of Primary Training or from Corps Training provided they are considered capable of being improved by a Specialist in Physical Medicine.

In addition the qualifying age for admission to a P.D.C. has been raised to 35 and it is hoped that these measures will help to reduce to a minimum the numbers of men arriving at the stage of Field Force training who are not physically capable of undertaking the work of the unit.

It would seem that the future of Physical Development Centre work is assured. The success they have achieved would seem to warrant such a course of pre-Service training for all men joining the Army.

A man's actual category would be determined in function, any minor physical defects corrected and his general physique balanced by specialized and graduated training.

Clinical and other Notes.

AN EXPERIMENT IN THE TREATMENT OF SCABIES WITH DERRIS ROOT POWDER.

BY CAPTAIN C. V. A. HENRIQUES,

Royal Army Medical Corps.

THE following experiments were carried out while the writer was serving with an A.A. Division. He had a Medical Post with thirteen beds reserved for scabies cases.

During August, 1941, the attention of the writer was drawn to a number of articles on the treatment of scabies by means of a suspension of derris root powder in water. These writers had recorded a high percentage of cures and the treatment of a series of scabies cases with derris powder was begun. The following is a short account of the results obtained and conclusions drawn. In all 270 cases were treated.

In order to give the method a good trial, care was taken to have the general conditions under which the experiment was carried out as favourable as possible. Thus, to ensure that such disinfection as was carried out was properly done, a small generator for superheated steam and a Serbian Barrel were constructed. Next, the R.A.M.C. orderlies, who were actually to carry out the treatment, were thoroughly trained by the writer in the technique of application and general routine. The closest co-operation with the various units concerned was also secured. The derris powder used was a standardized one containing 8 per cent. Rotenone.

First Method. Series 1.—The first series of cases consisted of 20 mildly infested cases showing scanty physical signs and the method employed was that first used by some previous workers. The infested patient was given a hot bath and scrubbed with soap flakes and water. He was then dabbed all over, by an orderly wearing rubber gloves, with a gauze pad soaked in the derris root suspension (2 ounces derris root to a quart of water containing 1 ounce of soap flakes, the suspension necessarily freshly made up daily). The application was then allowed to dry leaving a fine deposit of the derris powder on the skin. The suspension was *applied all over the body from neck to toes*. The time taken for each application was six or seven minutes. The patient was then clothed in clean pyjamas and his old battle dress and was allowed up and about the Medical Post. Six applications of the derris suspension were made in forty-eight hours at intervals of about four hours.

At the end of forty-eight hours the patient was given a bath and a clean set of underclothes. He was also given about 4 ounces of lotio calamine B.P. with

instructions to apply this daily to the sites of any visible lesions or any residual irritation.

On being discharged to his unit the patient was given a note to his Medical Officer requesting that he be sent back to the Medical Post for medical inspection in seven days time.

Such re-examination was carried out every seven days for twenty-eight days, at the end of which time, if all lesions and symptoms of irritation had disappeared, the case was regarded as cured.

Results. First Series. Analysis.—Out of the *first* series of twenty cases treated, twelve relapsed, i.e. 60 per cent, within ten days of treatment. Ten of these cases were mild infestations, six were moderately infested and four were severely affected, the lesions covering trunk and limbs. The relapses were subjected to a second altered course of treatment, and after twenty-eight days' surveillance, were found to be cured.

Such a result was very disappointing and it was decided to modify the treatment and start again. It was at first thought that an increase in the strength of the derris suspension was necessary but on further consideration it was decided to modify the technique for the following reason. It occurred to the writer that perhaps the failure encountered in the first series of cases might be due to the fact that the parasiticide was not coming in contact with the *Sarcoptes* or their ova or nymphs. This failure of contact was thought to result from the sealing up of the burrows in the skin by dry serous exudate produced by too vigorous scrubbing. This exudation was observed through a high magnification lens. With this fact in mind, the technique of application was modified in the following manner :—

After the initial hot bath and scrubbing, the patient was *not* dried and the derris suspension (warmed to 100° F.) was *lightly* scrubbed into the skin with a special *soft* brush. After this, he was allowed to dry off in a comfortably warm room (to facilitate quick drying) before putting on his pyjamas and battle dress. Each five subsequent applications were made in the same manner at intervals of four hours during the day.

Disinfestation.—The only disinfestation carried out was that of underclothes, shirt, pyjamas and blankets. No disinfestation of battle dress, greatcoat or bedding was done.

Second Series. Analysis.—

Number of mild cases	..	..	..	..	..	..	150
Number of moderately severe cases	..	..	..	..	..	..	72
Number of severe cases	..	..	..	..	..	..	28

Eight out of the mildly infected cases relapsed within seven to ten days ; three of the moderately severe cases relapsed within ten days ; four of the twenty-eight severe cases within seven days. Thus out of a total of 250 cases of the second series fifteen relapsed, i.e. 6 per cent. All relapsed cases were again subjected to a further course of treatment and subsequently cleared up.

When questioned as to how they felt during the treatment, the vast majority of the patients stated that irritation ceased after the second application of the derris solution. Some complained of a slight burning sensation which immediately preceded the disappearance of irritation.

Complications.—The complications encountered in this series of 250 cases were four cases of mild chemical dermatitis of the scrotum, arms, trunk or thighs, the patients suffering from this complication being all red-headed men. The cases affected by a scrotal dermatitis yielded to treatment within a few days with lotio calamine frequently applied. The cases of more widespread dermatitis were treated with a zinc and ichthyol cream and cleared up in about sixteen days.

CONCLUSIONS DRAWN FROM THE EXPERIMENT.

- (1) Effective cure could be obtained within forty-eight hours in 94 per cent of cases when using the second technique.
- (2) The complications were on the whole slight and yielded easily to treatment.
- (3) Red-haired people should not be treated with derris root.
- (4) The treatment is cheap, approximately 1½d. per case.
- (5) It is necessary to have a standardized technique and to have orderlies trained therein.
- (6) In the opinion of the writer this method compares favourably with other more popular methods of treatment, especially when the time factor is an important consideration.

The writer, who has had some experience with other methods of treatment, is of the opinion that, no matter what substance is used in the treatment of scabies, the success of such treatment depends primarily on two important facts, viz. :—

- (1) That every effort is made to ensure that the parasiticide used comes in contact with the *Sarcoptes* and their ova.
- (2) That the technique is carried out by orderlies who are thoroughly versed in the routine.

It is unfortunate that, owing to the great demand for derris root for agricultural purposes, it has not been possible to conduct further experiments with this promising treatment.

Finally, it appears that it would be possible, with further modification of technique, for this method to be carried out under average unit conditions without the absence of the patient from duty except for a few hours.

THE BRUNTON AURISCOPE.

A SIMPLE AND EFFECTIVE METHOD OF OBTAINING SATISFACTORY LIGHTING WHEN USING A BRUNTON AURISCOPE.

BY CAPTAIN I. GILBERT,
Royal Army Medical Corps,

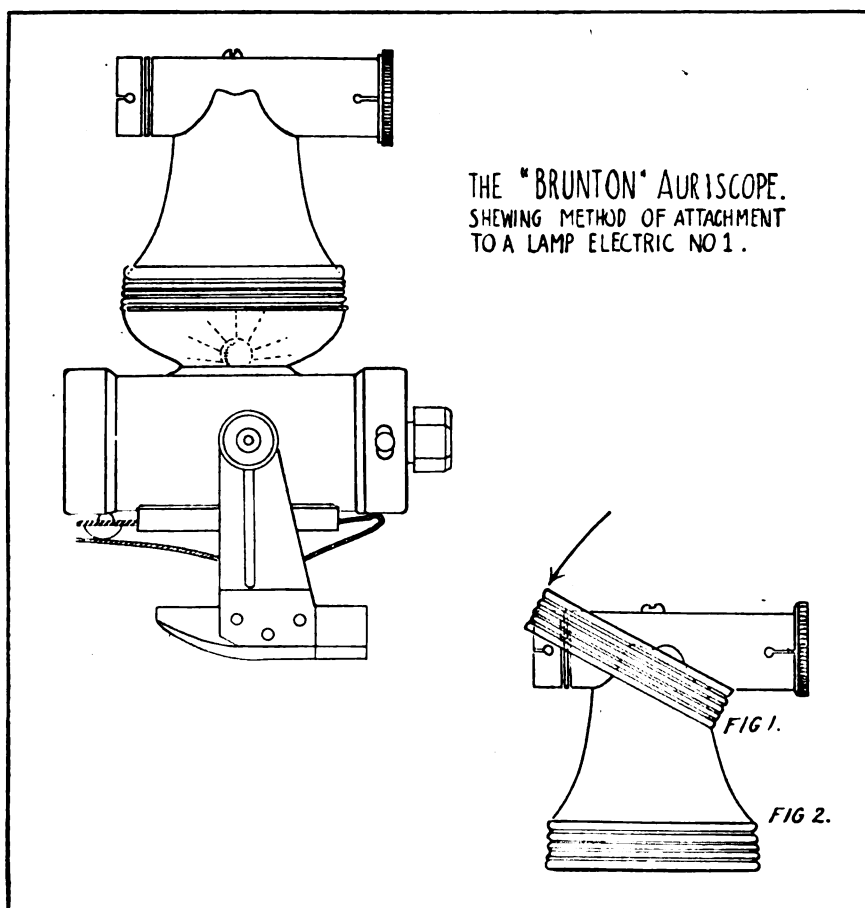
AND

SERJEANT P. R. O. POWIS,
6 Beds. & Herts. Regt.

THE Brunton auriscope is still supplied as part of the Regimental Medical Equipment.

When using this instrument one has often found great difficulty in obtaining satisfactory lighting, especially if one has to work in a dugout or cellar.

The diagrams show a very simple manner of using this auriscope with a



Lamp, Electric, No. 1, a type of lamp which is in common use throughout the Army.

This arrangement ensures an adequate beam of light down the trumpet of the auriscope. The method of attachment is indicated in the diagram. Some difficulty, however, may be experienced in sliding the screw cap over the horizontal tube of the auriscope (figs. 1 and 2).

Another practical way in which this device can be used is as a map reading lamp. Anyone who has experienced the inconvenience of trying to read a map at night in a truck when bright lights are forbidden will readily appreciate how useful this combination can be. Its main advantage is that a magnified beam can be obtained which will not blind the driver.

ECONOMY OF DRESSINGS.

BY CAPTAIN H. RATHLE,

Royal Army Medical Corps.

THE experience resulting from about 4,500 cases amongst Native labourers in six months enables me to recommend this formula for an ointment for treatment of infected wounds, cuts and tropical ulcers.

Formula

Cod-liver Oil	..	..	..	40 parts
Oxide of Zinc Ointment	..	..	..	60 "
Copper Sulphate Powder	..	..	..	1 part

The cod-liver oil and oxide of zinc alone would have permitted the continuance of infection. The copper sulphate, in this form, is very effective. The whole preparation is very cheap to produce.

In fact, those wounds and ulcers which would have taken weeks for recovery with, on the whole, bad cicatrices, were cured completely within a few days with, in addition, the following advantages:—(a) Disappearance of pus after twenty-four hours, (b) disappearance of burning sensation, and (c) rapid appearance of red granulations in the centre of the wound and spread of cicatrization at its edges.

The dressings are changed almost every day for the first two or three days but, later, can be left on the wound for four or five consecutive days. In addition, the patient can carry on with his ordinary duties and, when changed, the dressing, not being sticky, does not hurt either the patient or the processes of healing.

One of the principal advantages is the great economy in dressings which is about 70 per cent.

This formula can be made use of even on wounds of moderate size.

Applied by me on about 4,500 cases of accidents at work, it has always given surprising results.

DIPHThERIA VIRULENCE TESTS ON THE SYRIAN HAMSTER.

By RIVKA ASHBEI.

AND

ALEXANDRA POLIAKOVA.

From the Department of Parasitology of the Hebrew University, Jerusalem.

OWING to the present shortage and comparatively high cost of guinea-pigs it was decided, on the suggestion of Major E. G. Holmes, R.A.M.C., to carry out experiments on hamsters with a view to finding out whether they could be used in lieu of guinea-pigs for diphtheria virulence tests.

The following experiments were carried out :—

Experiment 1.—Four strains of morphological *C. diphtheriae* isolated from cases of clinical faucial diphtheria and one strain from a cutaneous ulcer were used. For convenience they will be referred to as A, B, C, D and E respectively. Strain E had already been proved virulent by guinea-pig inoculation ; the virulence of the four other strains was not known.

0·2 c.c. of emulsions in saline from forty-eight hour cultures on Loeffler's medium was injected intradermally into ten hamsters, five of which had been splenectomized. One normal and one splenectomized hamster were injected with each strain. The results are summarized in the following table :—

Strain	Normal hamster	Splenectomized hamster
A	Died within 24 hrs. with macroscopic hæmorrhages in the suprarenal, kidney and intestine. No local reaction	Died within 24 hrs. with marked local reaction and macroscopic hæmorrhages in the suprarenal, kidney and intestine
B	Died within 24 hrs. Lesions as above	Died within 48 hrs. Lesions as above
C	Died within 48 hrs. Lesions as above	Healthy after 48 hrs. No skin reaction
D	Healthy after 48 hrs.*	Healthy after 48 hrs.* No skin reaction
E	Died within 24 hrs. Lesions as above	Died within 48 hrs. Lesions as above, excepting that there was no skin reaction †

* This strain has subsequently been proved avirulent by guinea-pig inoculation.

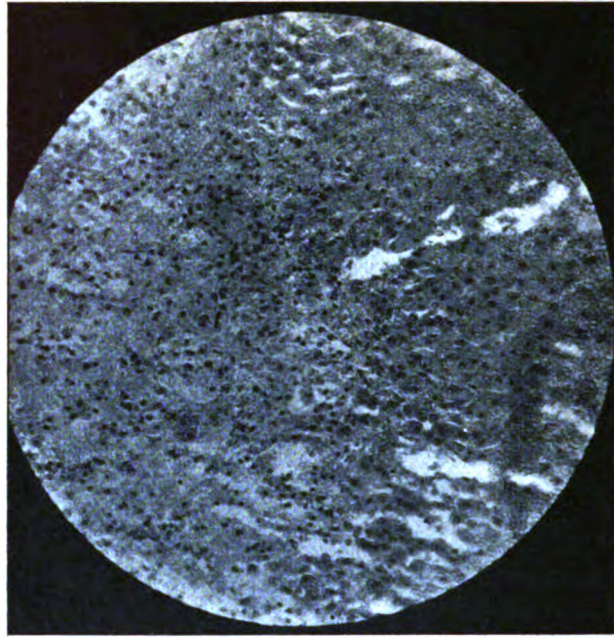
† It was found at autopsy that the spleen of this hamster had only partially been removed.

The lungs were not examined in this series of autopsies.

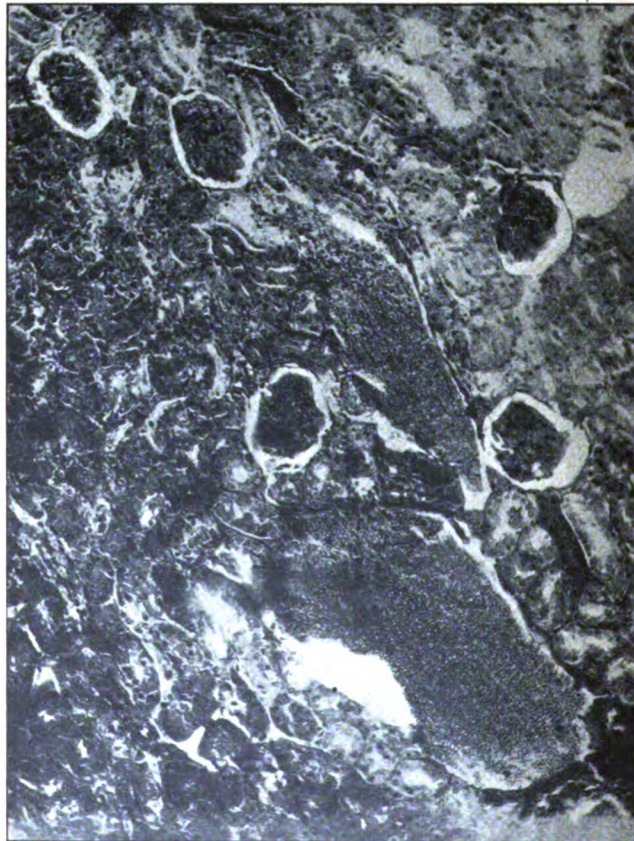
Experiment 2.—Diphtheria standard toxin was injected subcutaneously into two hamsters in 0·1 c.c. and 0·2 c.c. amounts respectively. The latter animal died after forty-eight hours with a clearly marked skin reaction and with macroscopic hæmorrhages in the suprarenals, kidneys, and on the pleural surfaces.

The former animal died on the fifth day but the autopsy was performed too long after death to be of value.

Experiment 3.—0·2 c.c. of a saline emulsion of a twenty-four hours subculture of *C. diphtheriae* (strain C of Experiment 1) was injected subcutaneously into each of four hamsters : two received also at the same time 0·25 c.c. concentrated diphtheria antitoxin intraperitoneally. Both protected animals survived ; both



Suprarenal gland.



Kidney.

others died after forty-eight hours with marked local reactions and with the usual hæmorrhages in the suprarenals, kidneys and lungs.

(See microphotographs showing hæmorrhages in the suprarenal gland and the kidney.)

Experiment 4.—Three pairs of guinea-pigs and hamsters were inoculated subcutaneously with toxin antitoxin mixture as follows :—

A. Guinea-pig : 4 c.c. of a mixture containing 0·7 c.c. standard toxin and 1 unit of standard antitoxin.

Hamster : 2 c.c. of the same mixture.

B. Guinea-pig : 4 c.c. of a mixture containing 0·7 c.c. standard toxin and 1 unit of time-expired antitoxin *x*.

Hamster : 2 c.c. of the same mixture.

C. Guinea-pig : 4 c.c. of a mixture containing 0·7 c.c. standard toxin and 1 unit of time-expired antitoxin *y*.

Hamster : 2 c.c. of the same mixture.

The results were as follows :—

Pair A.—Both animals remained healthy.

Pair B.—Guinea-pig died after 24 hrs.

Hamster „ „ 48 hrs.

Pair C.—Guinea-pig died after 48 hrs.

Hamster „ „ 96 hrs.

All of the above animals which died showed obvious hæmorrhages in the suprarenal glands.

Conclusion.—The hamster is susceptible to diphtheria toxin and could be used for virulence tests.

Our thanks are due to Dr. Gurewitch, Dr. Weber and Mr. Hermoni, of the Bacteriological Department of "Hadassah," for supplying us with the strains of *C. diphtheria* and to Dr. Ulitsky, of the Department of Bacteriology of the Hebrew University, and Major J. E. Jameson, R.A.M.C., for their help.

SOME SEROLOGICAL AND BIOCHEMICAL OBSERVATIONS ON RELAPSING FEVER.

BY MAJOR K. C. DIXON, M.A., M.B., B.CHIR., PH.D.,

Fellow of King's College, Cambridge,

Royal Army Medical Corps.

THE following observations were made on a series of relapsing fever cases among troops in Cyprus during the first half of 1942. In all cases thick drop films of blood from the patients were found to contain certain organisms with the morphological characteristics of *spirochaeta recurrentis*.

Two points were investigated :—

(1) Observations were made on the extent to which the serum of relapsing

fever cases gives positive flocculation reactions. Although it has long been known that positive Wassermann reactions may occur in relapsing fever it appeared desirable to ascertain to what extent, if any, such seropositive reactions interfere with routine diagnostic tests for syphilis. For this purpose blood was drawn from the patients as soon as possible after the diagnosis of relapsing fever was established. Kahn tests were performed on the resulting sera along with tests on large numbers of sera from V.D. patients which were being examined in the routine work of the laboratory at the same time.

(2) Jaundice occasionally occurs in relapsing fever. Liver damage, insufficient to produce jaundice but extensive enough to cause urobilinuria, might well be a more frequent concomitant of infection with the *spironema*. Accordingly urine from relapsing fever patients was examined by Slesinger's test for the presence of urobilin. Ehrlich's test for urobilinogen was also employed. Usually both tests gave parallel results. In all except a few cases both the blood for Kahn tests and the urine were collected before arsenic therapy had been started.

RESULTS.

The following table summarizes the results obtained :—

DISCUSSION.

(1) *Kahn Reaction*.—It will be seen from the table on p. 195 that out of 24 cases of relapsing fever, 4 gave seropositive Kahn reactions, 1 a partially positive reaction and the remainder seronegative reactions. Unfortunately it was only possible to follow up two of the seropositive cases after discharge from hospital. In one of these (Case 18) the serum remained positive for at least three weeks, and in the other (Case 8) the serum was still positive one month after the first test. In this latter case arthritis with effusion into knee and ankle joints followed the attack of relapsing fever.

During this same period (March 24—August 14) some 1,600 specimens of serum were examined from V.D. patients (or patients suspected of V.D.), including many patients under treatment for syphilis. From all specimens examined by flocculation tests during this period there were 129 seropositive reactions. Of these, one positive (++) reaction was given by serum from a patient suffering from leprosy, and 6 seropositive specimens were from relapsing fever patients (4 patients in all). It is probable that nearly all the remaining seropositive reactions were caused by syphilis. Excluding the one partially positive serum, the 19 other relapsing fever cases (over 70 per cent) all gave seronegative reactions. In fact, most cases of relapsing fever give negative Kahn reactions. Since the beginning of the year only 40 cases of relapsing fever, all told, have been diagnosed in the laboratory although blood smears from 1,578 cases of fever (including malaria and sandfly fever) have been examined for the presence of *spironema recurrentis*. It would follow that only a minute percentage of patients on whom serodiagnostic tests for syphilis are performed has actually had relapsing fever recently and in any case only a few of these would give seropositive reactions as a result of their relapsing fever. It appears likely therefore that relapsing fever cannot account

Case number and Nationality of patient	Date or dates on which syndroma recurrentis was found in blood	Date or dates on which blood for serological tests was drawn	Kahn reading in tube 1	Kahn reading in tube 2	Kahn reading in tube 3	Result of Kahn test	Date on which urine was examined	Biochemical properties of urine
1. Palestinian	12.1.42		—	—	—	—		
	12.2.42		—	—	—	—		
	11.3.42	26.3.42	—	—	—	—		
2. Indian	11.3.42	24.3.42	—	—	—	—		
3. Indian	18.3.42	24.3.42	—	—	—	—		
4. British	24.3.42		—	—	—	—		
	16.4.42		—	—	—	—	26.4.42	Much urobilin*
	5.5.42		—	—	—	—		
	17.5.42		—	—	—	—		
5. British	26.6.42		—	—	—	—	26.6.42	Much urobilin
6. British	24.3.42	24.3.42	—	—	—	—		
7. Indian	26.3.42	26.3.42	+	+	+	+	25.4.42	Much urobilin* No bilirubin
	2.4.42	2.4.42	+	+	+	+		Urobilin present*
8. Indian	20.4.42	20.4.42	+	+	+	+		
	16.6.42	16.6.42	—	—	—	—		
	23.6.42	23.6.42	+	+	+	+		
9. Indian	24.4.42	24.4.42	—	—	—	—	24.4.42	Much urobilin*
10. Indian	17.5.42	19.5.42	—	—	—	—	17.5.42	Much urobilin No bilirubin
			—	—	—	—	24.5.42	Urobilin present
11. British	24.5.42	29.5.42	—	—	—	—		No bilirubin
			+	+	+	+	7.6.42	Much urobilin
12. Indian	7.6.42	7.6.42	—	—	—	—		No bilirubin
			—	—	—	—	26.6.42	Much urobilin
13. Indian	26.6.42	26.6.42	—	—	—	—		No bilirubin
14. Indian	29.6.42	29.6.42	—	—	—	—	29.6.42	Much urobilin
			—	—	—	—	29.6.42	Urobilin present
15. Indian	30.6.42	30.6.42	—	—	—	—		No bilirubin
			—	—	—	—	2.7.42	Much urobilin
16. Indian	2.7.42	2.7.42	—	—	—	—		Urobilin present
			—	—	—	—	20.7.42	Much urobilin
17. Indian	20.7.42	21.7.42	+	+	+	+	21.7.42	Much urobilin
18. Indian	21.7.42	27.7.42	+	+	+	+		
		10.8.42	—	—	—	—		
19. Indian	22.7.42	22.7.42	—	—	—	—	22.7.42	Urobilin present
	9.8.42	9.8.42	—	—	—	—		
20. Indian	25.7.42	25.7.42	—	—	—	—	25.7.42	Much urobilin
21. Cypriot	10.8.42	10.8.42	—	—	—	—	10.8.42	Much urobilin
22. British	10.8.42	10.8.42	—	—	—	—	10.8.42	No urobilin
23. British	12.8.42	12.8.42	—	—	—	—	12.8.42	Much urobilin
24. Indian	13.8.42	13.8.42	+	+	+	+		

— denotes negative result.

+ denotes positive result.

—+ denotes doubtful or + — partially positive result.

* denotes that in these cases any urobilinogen present was oxidized to urobilin before the test.

for any significant number of seropositive reactions obtained in routine V.D. investigation in the Middle East. However, in the presence of a clinically unexplained positive reaction, the possibility of these patients recently having had relapsing fever should be considered.

(2) *Urobilinuria*.—The urine of 18 cases of relapsing fever was examined for the presence of urobilin. In 13 of these urobilin was present in definitely abnormal amounts (*see* above table). In only one case was no urobilin detected. In many cases the fluorescence obtained in Slesinger's test was so strong that it could be seen without exposure to direct sunlight. In fact the green fluorescence could be seen as the tubes lay in a rack on the bench in comparatively feeble illumination.

Of other febrile conditions in the Middle East I have examined the urine for urobilin in 8 cases of sandfly fever, 7 cases of malaria¹ and 5 cases of enteric fever. In none of these cases of sandfly fever examined (all with pyrexia of over 100° F. and with blood films negative for malarial parasites) was urobilin present in abnormal amount. In 4 cases, however, it was detectable after special illumination with a cone of light from a lens. In 6 out of 7 cases of malaria (including one malignant tertian case) the urine contained large amounts of urobilin. This was also the case in 5 cases of infection with organisms of the enteric group (4 cases of *bact. typhosum* and one case of *bact. paratyphosum B*).

Urobilinuria arises in two ways. Firstly, excess of urobilin is produced in hæmolytic conditions where abnormal amounts of urobilin are being formed from bilirubin resulting from catabolism of hæmoglobin. This probably explains the presence of abnormal amounts of urobilin in the urine of malarial patients. Secondly, where hepatic damage has occurred, the normal oxidation of urobilin back to bilirubin is inhibited, even where the injury to the liver is too small to impair the disposal of bilirubin itself by the liver cells. Here urobilinuria occurs, often in the absence of jaundice, owing to the accumulation of urobilin in the blood and its subsequent excretion in the urine. In typhoid fever the focal necrosis of the liver cells would account for the urobilinuria observed while, in relapsing fever, it seems reasonable to suppose that liver damage also explains the abnormal excretion of urobilin. The jaundice which sometimes occurs in relapsing fever is doubtless produced by liver damage. Other spirochaetes also seem to have a predilection for hepatic tissue, as in Weil's disease and also sometimes in syphilis. It would thus appear that the urobilinuria of relapsing fever may well be due to invasion of the liver by the *spirochaeta*. Sufficient damage is thus caused to produce urobilinuria but not enough in most cases to give rise to jaundice.

SUMMARY.

(1) Nineteen out of 24 cases of relapsing fever examined gave negative Kahn reactions. Of the remaining 5 cases, 4 were seropositive and one was partially positive.

¹ Manson-Bahr regards the presence of urobilinogen in the urine of latent cases of malignant tertian malaria as being of diagnostic importance.

(2) The urine in relapsing fever generally contains relatively large amounts of urobilin.

I wish to thank my clinical colleagues Captain R. C. Wood, Captain K. M. Rao and Jemadar Inayatullah Khan for their kind co-operation and also Mr. A. J. Gorman for his valuable assistance.

A CASE OF TRAUMATIC ANEURYSM OF THE LINGUAL ARTERY.

BY CAPTAIN MORTIMER H. SHAW.

*Royal Army Medical Corps,
Surgeon, Det. No. — Maxillo-Facial Unit.*

Case History.—At 07.00 hours on April 5, 1943, Trooper —, of the 10th Hussars, was wounded in action by a shell fragment which entered the mouth, caused a compound comminuted fracture of the mandible, passed through the floor of the mouth and lodged in the left side of the neck.

A.—Treatment before arrival at No. — Maxillo-Facial Unit.

(i) 15 L.F.A. (M.D.S.) April 5, 1943.—The case was received at 11.00 hours in poor general condition, pulse 65 and B.P. 75/35, but 2 pints of blood, administered by No. — Field Transfusion Unit, restored the B.P. to 120/80. It was found that the patient could not swallow even liquids and a tender swelling was noted on the left side of the neck. The latter increased in size and caused respiratory difficulty; it was thought to be due to hæmorrhage or œdema spreading from the site of the retained foreign body. An emergency tracheotomy was performed under local anæsthesia at 11.15 hours by No. — Field Surgical Unit, with rapid improvement in the patient's condition. Three pints of intravenous glucose saline sulphanilamide were administered by slow drip during the afternoon since mouth feeding was impossible and, at 15.00 hours, the patient was evacuated, accompanied by a Medical Officer, to No. — (N.Z.) Casualty Clearing Station.

(ii) No. — (N.Z.) C.C.S. April 6.—On arrival at 19.00 hours on April 5, pulse was over 130 in rate and of poor volume and one pint of blood was administered. An operation was performed here in which the mucosal tear in the left side of the tongue and floor of mouth was sutured; an incision was made in the left side of the neck, a large hæmatoma was evacuated from beneath the cervical fascia and a metallic fragment 1 by $\frac{1}{4}$ inch was removed through it. During the day of April 6, 5 pints of glucose saline and 3 pints of 0.5 per cent sulphanilamide were given but a total of only 300 c.c. of fluid was taken by mouth.

(iii) No. — C.C.S., April 7 to 9.—Here the general condition improved and routine mouthwashes and cleansing of the tracheotomy tube were commenced. A little fluid was taken by mouth by means of a 10 c.c. glass syringe and rubber tube but the main fluid was supplied by No. — Field Transfusion Unit in the form of 7 pints of glucose saline on April 8. This was discontinued on April 9, for air evacuation to No. — Maxillo-Facial Unit, att. No. — General Hospital.

B.—Treatment at No. — Maxillo-Facial Unit, Att. No. — General Hospital.

On arrival here on the evening of April 10, he was excited and jumpy but surprisingly cheerful and helpful, writing messages on paper with a pencil and complaining only of the swelling under his tongue and in the left side of his neck.

(i) *Clinical Examination*.—The outer tracheotomy tube was *in situ* but insertion of the inner tube constantly caused distress and coughing and was reluctantly abandoned; there was a free discharge of mucopus from the trachea and surrounding the opening was an area of cellulitis extending outwards for about 1 inch.

There was a laceration of the upper lip with loss of the mucosa of the red margin in the middle three-fifths. The tongue was grossly swollen and protruding from the mouth and blood-stained saliva continually dribbled from under it.

An incised wound was present in the left side of the neck below and parallel to the greater wing of the hyoid bone and a discharge of pus and old brown altered blood escaped from it, together with a persistent leak of fresh bright blood.

There was marked inflammatory swelling of the greater part of the left side of the neck.

(ii) *Intra-oral Examination*.—There was a rent in the left side of the floor of the mouth involving the side of the tongue and the whole of the floor of the mouth was distended from below by a large hæmatoma.

Teeth present :—

8	7	3	2	1	1	2	3	4	6	8
7	6	5	4							8

There was a severe comminuted fracture of the mandible from $\overline{3}$ to $\overline{6}$ region, with loss of the alveolar portion, the lower border being still present although fractured.

3	2	1	1	2	3	4
						6

were fractured.

(iii) *Operation April 11*.—Under continuous pentothal anæsthesia (Captain M. Ruston, R.A.M.C.) the tracheotomy tube was removed and a fresh one inserted and stitched *in situ*. The wound in the side of the tongue and floor of the mouth led to a large hæmatoma cavity in the neck which communicated freely with the open incised wound of the neck. By bimanual palpation a strongly pulsating aneurysmal sac was felt just above the greater wing of the hyoid bone; the diameter of this when distended was about 1 inch; the wall was smooth as if it were a true aneurysmal dilatation of an arterial wall. The sac could be emptied by pressure and it distended again immediately in one pulsation when the pressure was released. There was considerable hæmorrhage occurring and it was considered wise to pass a safety ligature at a point proximal to the aneurysm and to leave it only loosely tied whilst dissecting out the sac for extirpation so that the hæmorrhage could be instantly controlled if it became excessive. The external carotid would naturally have been chosen but the wound in the neck was too low to allow an exposure of the vessel to be made without entering the septic wound. A fresh exposure of the common carotid was therefore made at the site of election, and a (double) No. 3 catgut ligature was loosely tied round it just above the omohyoid. The general condition of the patient had inevitably deteriorated by this time and hæmorrhage was quite free. It was decided that the risk attendant upon common carotid ligature was preferable to that which would be incurred by removal of the sac. The ligatures were then tied round the left common carotid and this wound was closed with a small drainage tube. The pulsation in the sac ceased and it collapsed and the hæmorrhage slowed down.

Meanwhile Captain B. V. Janes, The A.D. Corps (Dental Surgeon, No. — M.F.U.) extracted

3	2	1	1	2	3	4
						6

and took upper and two-piece lower impres-

sions of the remaining teeth in paribar for the subsequent manufacture of cast silver cap splints and applied eyelet wiring to the teeth for temporary fixation of the fragments. Just before intermaxillary fixation was accomplished the aneurysmal sac was again palpated and was found to be filled to about a third of its

previous size ; it was pulsating gently and, after having been emptied by pressure, filled again in three or four pulsations.

There was no further hæmorrhage and there were no sequelæ whatever from the common carotid ligature ; in two days the tongue swelling was greatly reduced and fluid was taken by mouth.

(iv) *Second Operation* April 14 (Continuous Pentothal).—The tongue wound was explored again and the aneurysmal sac was found to be sunken and collapsed down to about $\frac{1}{4}$ inch diameter. There was no pulsation in it. Free venous hæmorrhage from the wound in the floor of the mouth was controlled by a pack whilst Captain Janes cemented the cast metal splints to the teeth. On removal of the pack the cavity, now quite dry, was filled with sulphanilamide and the mucous membrane of the floor of the mouth was sutured over it with 6/0 catgut ; the neck wound was left open with a small vaseline gauze pack for drainage.

(v) *Convalescence*.—On April 15 the tracheotomy tube was corked and breathing was freely possible through the nose. The blood count was as follows :—Hæmoglobin—58 per cent, Red cells—3 million. White cells—total 24,000 (88 per cent polymorphs and 12 per cent lymph.). Three pints of matched group O-4 blood were administered by slow drip transfusion, raising the hæmoglobin to 78 per cent.

On April 17 the tracheotomy tube was removed and the wound soon healed. Final fixation of the fractured mandible was achieved by a "T"-shaped "fish-plate" across the silver splints fitted by Captain Janes.

Convalescence was only delayed by two incidents, firstly a left-sided pleurisy on April 24 with slight basal congestion which rapidly resolved on sulphapyridine, secondly a small abscess over the anterior end of the mandibular fragment, which was drained on April 28.

At the time of writing (May 10) all wounds have healed and the patient is fit and ambulant.

COMMENTS.

The case illustrates the following interesting points :—(i) Efficacy of early transfusion in the field for shock. (ii) Life saving tracheotomy in forward area. (iii) A traumatic aneurysm of the second part of the lingual artery which is a rare lesion. (iv) Common carotid ligature performed without sequelæ in a young subject (aged 22) in spite of poor general condition and recent hæmorrhage. (According to Kocker, hemiplegia follows in 20 per cent of cases above middle age.)

Reviews.

ROSE AND CARLESS MANUAL OF SURGERY. Seventeenth Edition. Two Volumes. By Cecil P. G. Wakeley, C.B., D.Sc., F.R.C.S., F.R.S.E., F.R.S.A., F.A.C.S., F.R.A.C.S., and John B. Hunter, M.C., M.Chir. Cantab., F.R.C.S.Eng. London: Baillière, Tindall and Cox. 1943. Vol. I, pp. xx + 840; Vol. II, pp. 926. 30 plates and 1,100 illustrations. Price 35s. net.

The seventeenth edition of this students' classic has been in some degree brought up to date. New illustrations have been introduced and a good deal of fresh subject matter bearing on traumatic surgery has been added. The chapter on fractures, however, shows little sign of revision. Some

of the methods which are given a good deal of space in this section would be generally considered as out of date.

The paragraph on injuries of the carpal bones remains sketchy and incomplete. It is noticeable that in fractures of the patella no consideration is given to the practice of excision.

The chapter on amputations gives an admirable survey of the surgery in a short space but has not been brought into line with the current views of the Ministry of Pensions.

The introduction of a section on war surgery has, of necessity, led to some dogmatism on matters which are still *sub judice*. This section as a whole does not appear very well balanced and suggests some hasty preparation with little time given for consideration. For instance, more than a page is devoted to the subject of blast injuries whereas the war surgery of the chest is covered in a few lines. It may further be noted that in the section on burns the use of coagulant jellies is advised for the first-aid treatment; this practice is not at present approved either in the British or American Armies.

Despite these minor criticisms, the volumes remain a monument of industry and within their relatively compact space contain a remarkably complete review of the whole field of surgery. These characteristics will no doubt lead it to retain its popularity with the student and the practitioner.

C. M. P.

THE TREATMENT OF SYPHILIS WITH ARTIFICIAL FEVER COMBINED WITH CHEMOTHERAPY. Results of Ten Years of Experience. A Critical Review. By Walter M. Simpson, M.D., F.A.C.P., H. Worley Kendell, M.D., and Donald L. Rose, M.D. Washington: U. S. Government Printing Office. 1942. Pp. iv + 51. 10 cents.

This pamphlet, published by the United States Public Health Service as Supplement No. 16 to Venereal Disease Information, is a critical review by Simpson, Kendell and Rose of the work carried out over a period of ten years on the subject mentioned in the title. The quotation from Sydenham (1624-1689) that "Fever is a mighty engine which Nature brings into the world for the conquest of her enemies" is singularly apt and is amply borne out by two observations made many years ago, viz. (1) that malaria has a favourable effect on syphilis, and (2) that an intercurrent bout of fever, such as an attack of pneumonia, may cut short an attack of gonorrhœa. From these observations it was deduced that both the *treponema pallidum* and the *gonococcus* were highly susceptible to heat and attempts were made to raise the temperature of patients suffering from diseases due to these organisms by various means with a view to obtaining rapid and complete cure. The discovery by Wagner-Jauregg that artificially induced malaria could cure or at any rate check the progress of general paralysis of the insane, a disease hitherto uniformly fatal, was epoch making and was followed by attempts by other workers to devise other and perhaps safer methods of inducing hyperpyrexia. Many investigators turned their attention to methods of raising the patient's temperature by physical means and perhaps the best known and

most widely used instrument for effecting this is the Kettering hypertherm. There are various types of instrument now in use but all depend on the same principle, i.e. the heating of the whole patient to a point which kills the invading organism without any serious effects on the tissues. At one time it was thought that malaria exerted its beneficial effects by means of factors other than or additional to the fever but this view now finds little support and it is fairly generally agreed that it is the height and duration of the fever which are the effective agents.

MINOR SURGERY ("The Practitioner" Handbooks). Edited by Sir Humphry Rolleston, Bt., G.C.V.O., K.C.B., M.D., F.R.C.P., and Alan Moncrieff, M.D., F.R.C.P. London: Eyre & Spottiswoode (Publishers), Ltd. 1943. Price 16s.

How often have we not seen some trivial minor surgical procedure undertaken "unadvisedly lightly and wantonly" instead of "reverently, advisedly, discreetly and soberly"? How simple these small procedures appear in the hands of the experienced doctor! How often does one see them hopelessly "bungled"? For the Introduction by Sir Alfred Webb-Johnson alone, this little book of less than 200 pages is worth having; the chapters are cram full of common sense and useful tips.

It was a happy thought on the part of the Editors which led to the republication in book form of the series of articles on minor surgery by well-known authorities which have appeared monthly in the *Practitioner* and the publishers, Eyre and Spottiswoode, Ltd., have done the job well although the price (16s.) reflects war conditions.

D. C. M.

A POCKET MEDICAL DICTIONARY (Sixth Edition).

A NEW DICTIONARY FOR NURSES (Eighth Edition).

Compiled by Lois Oakes, S.R.N., D.N. (Lond. and Leeds). Assisted by Thos. B. Davie, B.A., M.D. Liverpool., F.R.C.P. Lond. Edinburgh: E. & S. Livingstone. 1943. Pp. xx + 450 each. Price 4s. net each.

The issue of these two little dictionaries so soon after the previous editions is a sure sign of their usefulness and popularity.

Their compact size is not their least merit, containing as they do many useful appendices, diagrams, charts and tables on subjects of general medical interest.

The printing is clear, the binding should stand up to hard wear and, in these difficult times, the price is reasonable.

We recommend the booklets.

SOCIAL SERVICE IN THE CLINIC FOR VENEREAL DISEASE. Second Edition. By Dorothy Manchée. London: Baillière, Tindall and Cox. Pp. vi + 119. Price 5s. net.

No subject causes more argument than does Venereal Disease. There can, however, be no doubt that the social side of the problem must be tackled at the same time as the medical.

Miss Manchée in her book gives a short survey of the problem from the social

side and describes the social workers' part in the V.D. Scheme. She never suggests any activity which can be said to encroach on other sides of the problem.

The book is intended for trained social workers but should be read by those interested in young people's clubs, etc.

To medical men it is useful as it indicates the advantage of a trained social worker.

H. A. R.

Correspondence.

INCORPORATED SOLDIERS, SAILORS AND AIRMENS HELP SOCIETY LORD ROBERTS MEMORIAL WORKSHOPS.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—A great number of appeals are being made to the generosity of the British public but to-day gives me the opportunity to make a very special one. This is the 111th anniversary of the birth of Lord Roberts who devoted his entire life to the patriotic interests of this country and especially to the welfare of its fighting men. Not enough is known of the great work which has been going on for more than twenty-nine years to perpetuate his memory.

The Lord Roberts Memorial Workshops, on whose behalf I appeal to your readers, has over this long period been doing a magnificent work in rehabilitating men who have been disabled in war and helping them to resume useful and happy lives. This work maintains six busy factories in London, Colchester, Liverpool, Edinburgh, Dundee and Inverness, and more than 3,500 severely disabled men have been trained in skilled trades and restored to a normal environment.

As the tempo of the present war rises the demands on our facilities and resources are increasing rapidly and only a generous response on the part of the public will enable us to deal with our constantly growing responsibilities. All that these disabled men ask is a chance to resume their ordinary lives in the community and surely after the sacrifices they have made for us that is little enough to give them in return.

These Workshops constitute an eminently practical way of making a little money go a long way and produce the most gratifying returns. Therefore, I bespeak your special consideration for this work and any donation you may be able to make may be directed to our Hon. Treasurer, Admiral of the Fleet the Lord Keyes, at 122, Brompton Road, Room T, London, S.W.3.

*Appeals Department Head Office,
122, Brompton Road,
London, S.W.3.
September 30, 1943.*

I am, etc.,
BIRDWOOD,
Field-Marshal.

Notices.

THE UNIVERSITY OF BIRMINGHAM.—CHAIR OF SOCIAL MEDICINE.

THE Council invites applications for the newly established Chair of Social Medicine.

The appointment will carry an initial salary of £1,500 per annum, but it is hoped that this will subsequently be increased to £2,000 per annum.

The successful applicant will be expected to commence his duties as soon as possible after the appointment has been made.

Further particulars of the appointment may be obtained from the undersigned to whom applications (twelve copies) must be submitted, with the names of three referees, on or before March 1, 1944.

The University,

Edmund Street,

Birmingham, 3.

C. G. BURTON,

Secretary.

THE ROYAL INSTITUTE OF PUBLIC HEALTH & HYGIENE.

SERIES of lectures on "National Health," Autumn Session, 1943, to be delivered in the Lecture Hall of the Institute, 28, Portland Place, W.1, on Wednesdays, October 20 to November 17, at 3.30 p.m.

<i>Date.</i>	<i>Subject.</i>	<i>Lecturer.</i>	<i>Chairman.</i>
October 27, at 3.30 p.m.	" The New Approach to the Diagnosis of Pulmonary Tuberculosis "	Wing Commander R. R. Trail, M.C., M.A., M.D., F.R.C.P.	S. Cochrane Shanks, M.D., F.R.C.P., F.F.R.
November 3, at 3.30 p.m.	(<i>Illustrated by Lantern Slides</i>) " Dermatology and the Public Health "	Robert Klaber, M.D., F.R.C.P., D.P.H.	Major-General R. J. Blackham, C.B., C.M.G., C.I.E., D.S.O.
November 10, at 3.30 p.m.	" Osteoarthritis "	Matthew B. Ray, D.S.O., M.D., M.R.C.P.	The Rt. Hon. Lord Horder, G.C.V.O., M.D., F.R.C.P.
November 17, at 3.30 p.m.	" Mental Strain in War Time "	Colonel Henry Yellow- lees, O.B.E., M.D., F.R.C.P.	Wilfred Pearson, D.S.O., M.C., M.A., M.D., F.R.C.P.

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WE should be grateful to receive copies of the *Journal of the Royal Army Medical Corps* for July, August, October and November, 1942, and January, 1943, which any of our readers may wish to dispose of.

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EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in duplicate through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

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All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps," will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

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Except as in the first paragraph above, communications in regard to editorial business should be addressed—"The Editor, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, A.M.D.5, War Office, Whitehall, S.W."

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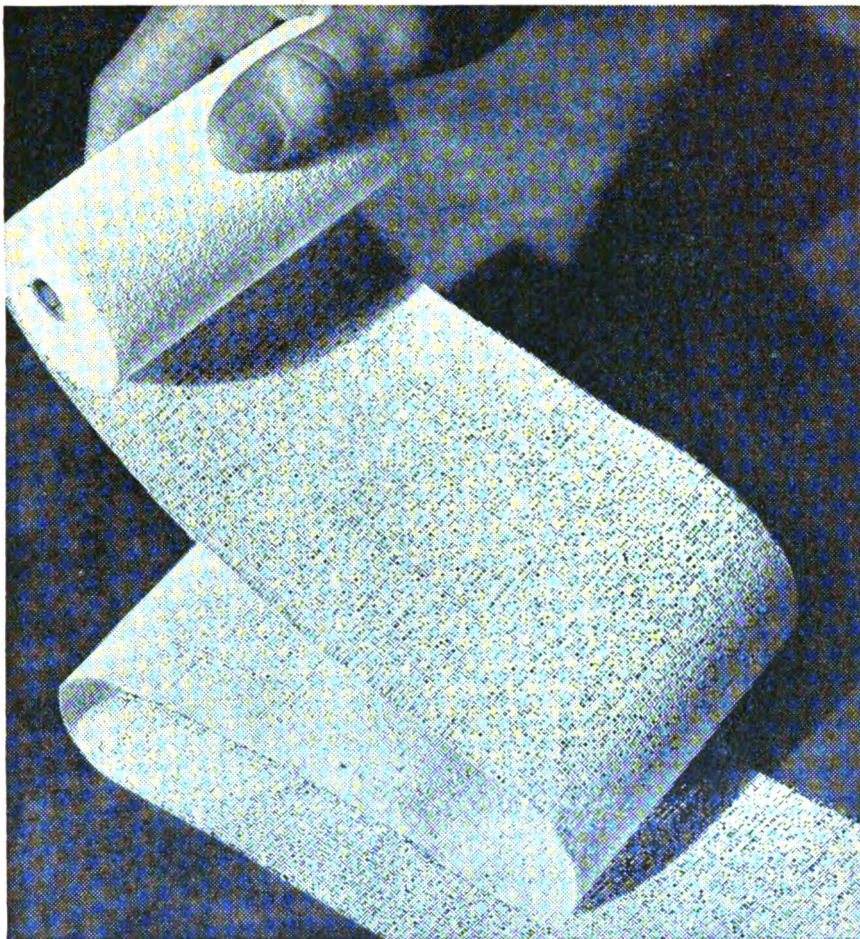
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JOURNAL

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Corps News.

OCTOBER, 1943.

EXTRACTS FROM THE "LONDON GAZETTE."

September 23, 1943.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire in recognition of gallant and distinguished services in North Africa :—

To be Additional Officers of the Military Division of the said Most Excellent Order :—

Lt.-Col. (Bt.-Col.) Geoffrey William Russell Bishop, T.D., M.B. (2252), Royal Army Medical Corps (Shepton Mallet, Somerset).

Major (temp. Lt.-Col.) John Henry Joseph Crosse (63166), Royal Army Medical Corps (Portmadoc, Glam.).

Major (temp. Lt.-Col.) Peter Thomas Leigh Day (51344), Royal Army Medical Corps (Fleet, Hants).

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To be Additional Members of the Military Division of the said Most Excellent Order :—

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Capt. Clifford James Cobbe, M.B. (114204), Royal Army Medical Corps (London, S.W.15).

Capt. (temp. Major) Walter Charles Gledhill, M.B., F.R.C.S. (133231), Royal Army Medical Corps (Balfour, Stirling).

Lieut. (Qmr.) (local Major) Robert Albert Morrish (135137), Royal Army Medical Corps (Portstewart, Co. Derry).

The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North Africa :—

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The Military Cross.

Capt. Gerard Sessions Hodge (139937), Royal Army Medical Corps (Crewkerne).

Capt. Graham Douglas Park (100998), Royal Army Medical Corps (Glasgow).

Capt. David Wright, M.B. (218952), Royal Army Medical Corps (Glasgow, W.1).

The Distinguished Conduct Medal.

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7345437 Cpl. James Alexander Rodgers, Royal Army Medical Corps.

7382257 Pte. Ronald Dixon, Royal Army Medical Corps (Hawick, Roxburghshire).

7345941 Pte. Albert Gelder, Royal Army Medical Corps (Hull).

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Queen Alexandra's Imperial Military Nursing Service.

Miss P. E. Wilkins, R.R.C., Actg. Matron (206523).

Miss J. C. Condon, Asst. Matron (206098).
 Miss E. V. Wallace, Asst. Matron (206528).
 Miss J. O'S. Donnelly, Sister (238147).
 Miss I. H. Gilmour, Sister (239984).
 Miss M. A. MacDonald, Sister (244255).
 Miss S. Mark, Sister (234444).
 Miss L. C. Moran, Sister (238697).
 Miss D. M. Smith, Sister (234354).
 Miss W. R. Tait, Sister (225455).

Territorial Army Nursing Service.

Miss D. K. Edmonds, Asst. Matron (213164).
 Miss E. M. Petch, Asst. Matron (221624).
 Miss M. McL. Reid, Asst. Matron (215313).
 Miss H. M. Harrison, Sister (213426).
 Miss K. M. Rice, Sister (215329).

September 28.—The KING has been graciously pleased to give orders for the following award of the George Medal, in recognition of conspicuous gallantry in carrying out hazardous work in a very brave manner:—

7354873 Sjt. James Fairclough, Royal Army Medical Corps (Haydock, near St. Helens).

September 24.—Major W. E. Adam, M.C., M.D. (3031), reverts to ret. pay on ceasing to be re-empld., and is restored to the rank of Lt.-Col.

September 28.—The undermentioned Lt.-Cols., having attained the age for retirement, are retained on the Active List supern. to the establ. :—

September 26.—(Temp. Col.) E. C. Linton (10643).

September 27.—(Actg. Col.) C. F. Anthonisz (13653).

Major (temp. Lt.-Col.) T. Parr, M.D. (8723), to be Lt.-Col., Sept. 26, 1943.

Major (temp. Lt.-Col.) G. E. L. Simons (1152), to be Lt.-Col., Sept. 27, 1943.

Temp. Col. (hon. Brig.) J. A. Sinton, V.C., O.B.E., M.B. (154437), I.M.S. ret. pay. Consultant in Malariology, is granted the local rank of Brig., Sept. 7, 1943.

October 8.—Major V. J. Bonavia, M.D., M.R.C.P. (15657), to be Lt.-Col., Oct. 4, 1943.

Lt.-Col. H. J. Bensted, M.C. (15778) having attained the age for retirement, is retained on the Active List Supern. to establishment, Oct. 4, 1943.

Capt. (W. Sub. Major) (temp. Lt.-Col.) T. D. Phelan, M.B. (56817), to be Major, Sept. 12, 1943.

October 12.—Col. (actg. Maj.-Gen.) J. G. Gill, D.S.O., O.B.E., M.C., M.B. (8368), to be temp. Maj.-Gen., Oct. 6, 1943.

Lieut. (Qmr.) A. E. Taylor, M.B.E. (73314), to be Capt. (Qmr.), Oct. 12, 1943.

The undermentioned short service Offrs. are appointed to permanent comms., retaining their present seniority:—

September 1.—Capt. (temp. Major) P. D. Stewart, M.B. (73570).

October 1.—Capt. (temp. Major) J. Mackay-Dick, M.B. (75585).

Regular Army Reserve of Officers.

September 24.—Lt.-Col. G. O. Chambers, M.C., F.R.C.S. (4898), ceases to belong to the R.A.R.O. on account of ill-health Sept. 25, 1943, and is granted the hon. rank of Lt.-Col.

October 12.—Col. H. H. Blake, O.B.E., M.B. (9383), late R.A.M.C., having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs. Aug. 1, 1943, and is granted the hon. rank of Major-Gen. (Substituted for the notifn. in *Gazette* (Supplement) dated Sept. 7, 1943.)

Major O. W. J. Wynne (14243), having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs. Oct. 6, 1943.

October 1.—Lt.-Col. E. V. Whitby, M.B. (18165), is restored to the rank of Col. Sept. 1, 1943.

DEATHS.

ECKERSLEY.—On May 12, 1943, Colonel Edwin Eckersley, late R.A.M.C., Retired. Born Aug. 28, 1861, he took the M.B., Edinburgh, in 1884, and was commissioned Surgeon July 28, 1886. Promoted Major R.A.M.C. July 28, 1898, Lieutenant-Colonel July 28, 1906, and Colonel March 1, 1915, he retired and was re-employed Aug. 28, 1918. He ceased to do duty Oct. 16, 1918. He was Deputy Assist. Director-General, A.M.S., War Office, Jan. 20, 1909, to Jan. 19, 1913. He was appointed Honorary Physician to the King May 17, 1918. He took the D.P.H., R.C.P.S., in 1907. He took part in the Ashanti Campaign of 1895-1896, receiving the Star. In South Africa he took part in the Relief of Ladysmith, including the action at Colenso, the action at Spion Kop, the action at Vaal Kranz, the operations on Tugela Heights Feb. 14 to 27, 1900, and the action at Pieters Hill. He was also present at the operations on the Zululand Frontier of Natal in Sept., 1901. He was awarded the Queen's Medal with five Clasps and the King's Medal with two Clasps. In the Great War he served on the North West Frontier of India in the operations against the Mohmands and Swatis in the vicinity of Shabkadar as A.D.M.S., receiving the 1914-15 Star, British War and Victory Medals.

CARLETON.—On June 8, 1943, Major Patrick Maurice Carleton, R.A.M.C., Retired. Born March 24, 1854, he graduated M.D., 1877, M.Ch., 1878, at the old Royal University of Ireland. Commissioned Surgeon March 6, 1880, he was promoted Surgeon Major March 6, 1892, and retired July 13, 1901. In Burma 1892-1893, he served in the Chin Hills, being awarded the Medal with Clasp. He took part in the operations in Natal in 1900, receiving the Queen's Medal with Clasp. He was a Barrister-at-Law of the Inner Temple and a J.P. for Co. Londonderry.

ADDERLEY.—On Sept. 27, 1943, Lieutenant, Colonel Arthur Charles Adderley, R.A.M.C.-D.S.O., Retired. Born in Douglas, Co. Cork, Jan. 20, 1873, he took the L.R.C.P.

and L.R.C.S., Edinburgh, and the L.R.F.P.S., Glasgow, in 1897, and was commissioned in the R.A.M.C. May 30, 1900. Promoted Captain May 30, 1903, Major May 30, 1912, and Lieutenant-Colonel April 15, 1918, he was placed on half-pay Dec. 7, 1927, and retired Jan. 7, 1928. He served in France and Belgium in 1915 and 1916 and in East Africa from Dec., 1916, till May, 1919. He was mentioned in despatches and awarded the D.S.O., 1914-15 Star, British War and Victory Medals.

ROBERTSON.—On Oct. 6, 1943, the result of a fall from a train at St. Mary Cray, Kent, Lieutenant-Colonel Hugh Given Robertson, O.B.E., R.A.M.C., Retired. Medical Officer of Kent C.C. Mental Deficiency Colony, Leybourne Grange, Kent. Born Nov. 30, 1883, he graduated M.B., Glasgow, in 1908 and was commissioned Lieutenant R.A.M.C. July 31, 1909. Promoted Capt. Jan. 31, 1913, Major July 31, 1921, and Lieutenant-Colonel May 1, 1934, he retired Oct. 1, 1936. He was re-employed as Recruiting Medical Officer, Birmingham, Feb. to Sept., 1939. He served in France and Belgium from Oct. 4, 1914, to Oct. 30, 1914, when he was taken prisoner. He was released in June, 1915. From April, 1916, till 1920 he served in Mesopotamia, Persia and the Persian Gulf. Four times mentioned, he received the O.B.E., 1914 Star and Clasp, British War and Victory Medals. He served on the North West Frontier of India in 1930-1931, being awarded the Medal with Clasp.

BROWN, Major S.—Killed in action.

FALLA, Major S. T.—Middle East.

GIBSON, Major R. S.—Home.

LOCK, Capt. A. E.—Middle East.

THOMSON, Capt. H. B.—Killed in action.

ADAM, Major G. A. H.—Missing at sea, believed killed.

FOXTON, Lt.-Col. H.—Missing at sea, believed killed.

MATTHEWS, Capt. H.—Missing at sea, believed killed.

WATSON, Major G. N.—Missing at sea, believed killed.

HENRY, Capt. J.—Killed, Italy.

ROYAL ARMY MEDICAL CORPS COMFORTS GUILD.

RECEIPTS AND PAYMENTS ACCOUNT FOR THE YEAR ENDED JULY 31, 1943.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
To Cash at Bank and in Hand at Aug. 1, 1942—							By Payments :—						
At Bank, Glyn Mills & Co.	969	16	4				Army Dental Corps Comforts Guild—						
In hands of Honorary Officials	9	12	7½				Their proportion of undistributed funds in the com- bined account as agreed, on July 31, 1942 :—						
				979	8	11½	Cash at Bank and in Hand	192	0	0			
Receipts :—							Comforts and Games	25	12	0			
Donations and											217	12	0
Subscriptions ..				1,687	14	3	Comforts—						
Sales of Wool ..				6	4	0	Wool	122	10	0			
							Books	36	1	6			
							Games	117	12	1			
							Other Comforts ..	151	8	0			
											427	11	7
							Prisoners of War Parcels and Com- forts	587	9	4			
											1,015	0	11
							Donation—						
							Duke of Gloucester's Red Cross and St. John Fund for Prisoners of War				200	0	0
							Office and Distribution Expenses—						
							Taxi Fares and Tra- velling	4	9	4			
							Stamps and Sta- tionery	23	19	7			
							Parcel Post ..	4	13	1			
							Packing Expenses	7	14	0			
							Cheque Books ..	1	0	9			
							Sundry Expenses ..	3	7	0			
							Audit Fee	5	5	0			
											50	8	9
							Cash at Bank and in Hand at July 31, 1943—						
							At Bank, Glyn Mills & Co. ..	1,187	0	3			
							In hands of Honor- ary Officials ..	3	5	3½			
											1,190	5	6½
											£2,673	7	2½
											£2,673	7	2½

We have prepared the above Receipts and Payments Account from the books, accounts and vouchers of the Guild and certify the same to be correct in accordance therewith.

83, CANNON STREET,
LONDON, E.C.4.
September 14, 1943.

HEMSLEY MILLER & Co.,
Chartered Accountants.

In addition to the above expenditure, a gift parcel of 200 cigarettes has been sent to every R.A.M.C. prisoner-of-war (other ranks) in Germany within the past two months at the cost of £400.

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Brit. med. J., 1942, 1, 12, and 1943, 1, 318.

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November, 1943.

No. 5.

Vol. LXXXI.

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OF

THE

Royal Army



Medical Corps

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Journal of the Royal Army Medical Corps.

Original Communications.

EXPERIENCES OF AN ADMINISTRATIVE MEDICAL OFFICER IN GREECE, 1941.

AN ADDRESS

BY COLONEL D. T. M. LARGE.

BEFORE going on to a description of the personal experiences of an administrative medical officer, during the campaign in Greece, I would like to bring to your notice two points in connection with our stay there which are important from the point of view of the arrangements made.

The first point I would ask you to remember is the shortness of the actual campaign. Although we were in Greece from the end of February, 1941, the campaign did not start until April 6 when the Germans launched their attack in the north and carried out a severe air raid on the docks at Piræus, the port of Athens. The campaign was over as far as we were concerned by the end of the month so that it lasted just three weeks.

Secondly, none of us on our arrival had any inkling of the fate that was in store for us. Our plans had all been made for a prolonged campaign and our preparations made to build up an elaborate line of communication behind the supposedly impregnable defensive position in the mountain ranges in the north of Greece.

Having made these two explanatory remarks at the commencement, I can now begin this recital of personal experiences and personal difficulties as D.D.M.S. with a few words about the medical arrangements in Greece when we arrived there at the end of February.

HOSPITALS.—When we arrived, there was only one hospital,—General, in a suburb of Athens called Kyphissia. This had 600 beds distributed in three luxury hotels all close together in this health resort of the Athenians.

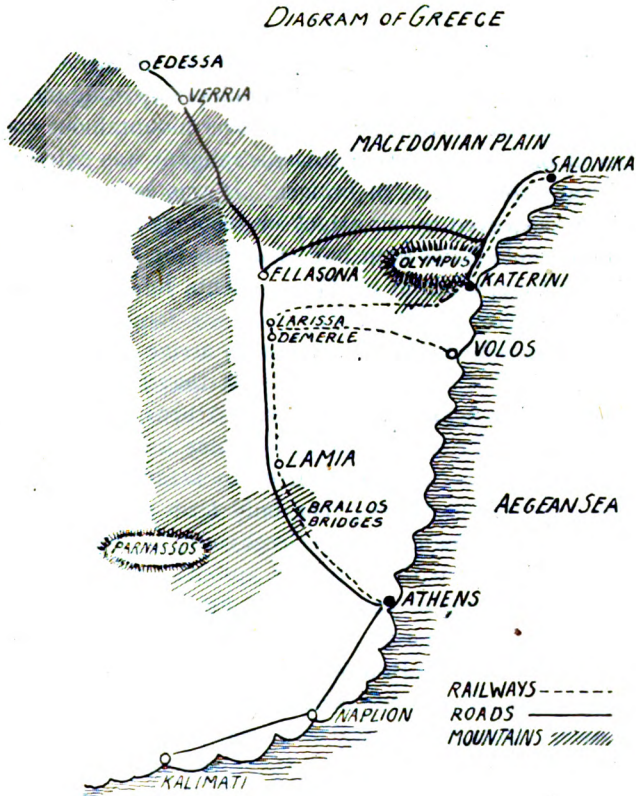
Expansion of this hospital in case of necessity was our first consideration as

it was the only British hospital at the time available for troops then arriving in large numbers. One could not ask the Greeks to help at all as every available inch of space in Athens was crammed with their own wounded resulting from their campaign against the Italians. In fact we were helping them for our hospital accommodated quite a large number of Greeks. I paid a visit to some of their hospitals early on in March at the invitation of the D.M.S. of the Greek Army and found them spotlessly clean but hopelessly overcrowded with wounded which included large numbers of cases of severe frost bite resulting from fighting the Italians in the thick snow of the hills and passes. Every bed was full and the floors of wards and corridors so crammed with stretcher cases that one could hardly move between them. Nursing must have been very difficult. It was obvious, therefore, that we could not ask the Greeks to do anything in the way of accommodating British sick and wounded and therefore an immediate expansion of the one hospital we had open at the time was pushed on with at all speed. Tents were erected on the lawns and tennis courts of the hotels and concrete bases put in. Beds and bedding were requisitioned from hotels and, in a very short space of time, further accommodation up to 1,200 beds was arranged around the central cookhouse and operating theatre. It is, of course, very much quicker to expand an existing hospital by 600 beds than to set up a new one of 600 beds as it is the administrative, surgical and laboratory arrangements of a new hospital which take the time to get going.

As well as this hospital in Athens we had at the beginning of March a company of a Field Ambulance. This was at the time acting as a reception station in Larissa, a town just short of the mountain barrier in the north of Greece. This also had to be made capable of accommodating casualties, for a time at least, until they could be evacuated and until new field medical units arrived. There were no buildings in Larissa suitable for hospital purposes at all and therefore tents were supplied and stretchers and palm beds provided so that lying down accommodation in tents for 200 was quickly afforded. It was thought that Larissa would be a certain target for enemy bombers as it was so near the front line and, therefore, when setting up this improvised hospital in tents, we had to pay particular attention to their dispersal. Tents had to be 30 yards apart. While this undoubtedly has an effect in minimising the damage from a bomb hit, it also adds greatly to the difficulties of nursing and feeding patients who are scattered in small groups over an area which may extend over many hundreds of yards. Whether this dispersal is really necessary in the case of a hospital, however, is an open question. It depends so much on the situation of the hospital with regard to other establishments of a military nature which are liable to bombing and also to the attitude of the Germans themselves. Certainly Larissa was frequently bombed but the tented hospital there was never attacked. The Red Cross was prominently displayed on the ground and the site was carefully chosen well away from other camps and from dumps. During the actual campaign, some German wounded in this very hospital were astonished when our men went into slit trenches during a raid. "They won't bomb us" they said "this is a hospital," and the planes overhead certainly did cease firing as they approached.

On the other hand, in Crete, the main landing ground for the parachutists was the hospital area occupied by — General Hospital although this also was clearly marked with the Red Cross. Their excuse for this was apparently that the hospital had selected the best ground available on the island for landing parachutists and that, if we chose to put a hospital there, that was our look out !

NEW MEDICAL UNITS.—The above was the medical provision in Greece at the end of February. It was, of course, not intended for the campaign against



Germany but only as medical provision for the airmen and aerodrome guards lent to Greece for her war with Italy.

New medical units commenced to arrive early in March and continued arriving all that month. Before describing their siting it is necessary for a moment to state briefly the geographical features on which the campaign depended, on which of course the position of medical units was hinged.

GEOGRAPHICAL FEATURES.—Greece is a very mountainous country but broadly speaking the ranges form themselves into a letter T, with the upright limb running north and south and the horizontal one limb roughly east to west. Our forces with their L. of C. were to the east of this T and our defensive position along

the mountain range forming the right half of the horizontal limb, which divides Greece proper from the Macedonian plain. (The left half of the horizontal limb was defended by the Greek Army and does not come further into the picture as far as we are concerned at the moment.) This defensive position ran along the northern slopes of this dividing mountain range, from Olympus in the east in a N.W. direction, but we had advanced units at many points in the foothills and on the plains of Macedonia in front of this, e.g. Katerini, Verria, Edessa, and these areas gave us much food for thought and planning with a view to prevention of malaria.

Our L. of C. ran on the eastern side of the central mountain range forming the upright of the letter T. From the front of the defensive position back to railhead at Larissa was a distance of over 100 miles of twisting mountainous road. The railway from Larissa to Athens also runs over mountainous country through deep gorges but at one point in the Parnassos range it was extremely vulnerable to air attack because of a series of bridges. It was estimated that had one of these bridges been destroyed by air attack or sabotage the whole railway system of communication would have been out of action for three months. This fact had to be taken into account in all arrangements for evacuation of casualties from the front to the base hospitals.

MEDICAL LAY-OUT.—Medical units began to arrive early in March, the first being a 600 bedded N.Z. General Hospital. At that time the urgent need was for a hospital somewhere nearer the front than Athens and certainly in advance of the vulnerable Brallos Bridges. The rail journey from Larissa back to Athens by express train before the campaign started took fifteen hours and during the campaign up to twenty-four hours. The only form of hospital train available then had to be obtained on loan from the Greeks and, as they themselves had been caught by the Italian war without proper ambulance trains, it was a hastily constructed affair consisting of cattle trucks fitted with stretchers. The discomfort and length of the journey, therefore, combined with the danger of a severance of the L. of C. at the Brallos Bridges, rendered it essential to place this N.Z. hospital as far forward as safety would permit and a site at Demerle Railway Station was chosen. Here the hospital set itself up in tents, dispersed at 30 yards interval, and it was a going concern inside three weeks from the time of its arrival.

Other medical units were now coming across from Egypt; numerous field ambulances which were sited in conformity with the movements and positions of brigades, two C.C.S.s and numbers of the smaller specialized units, for example, for blood transfusion, anti-malaria work, mobile laboratories, mobile bath units, and, last but not least, the complete fittings for a couple of ambulance trains. One of the C.C.S.s—No. — Australian—was sent forward to Ellasona well in advance of railhead where it was able to receive casualties from right and left sectors of the front. The other, — British C.C.S., was sited at Larissa to retain casualties pending their transfer to the N.Z. hospital at Demerle close by, if urgent, or to the base at Athens by ambulance train.

Two more Australian General Hospitals arrived; one of 600 beds was opened at Volos, a seaport to the east of Larissa, and the other of 1,200 beds was set up

near Athens at Kyphissia. An advanced Depot of Medical Stores had also arrived and was opened in Athens.

All of these units were open and functioning by the time the campaign opened on April 6 but, of the hospitals, only the New Zealand (up the line) and the original British (at Athens) were completely ready with their full complement of beds.

Hospital trains, however, had been got ready according to British standards by fitting the equipment received from Egypt into a number of refreshment cars and other stock received from the Greeks. Here may I put in a word of thanks to the Greeks. They were very short themselves of all medical material, and indeed of all war material, yet they did everything in their power to help, and to provide us with our requirements, even at the expense of running still more short themselves.

Just when we had got things about ready to receive large numbers of casualties the German attack began on April 6. Casualties began to come down the long winding road from the front, carried by a motor ambulance convoy to the C.C.S. at Ellasona. From here, after treatment, they were mostly evacuated down the line to Athens but the more serious cases were admitted to the forward hospitals at Demerle and Volos which were opening to receive them.

As things turned out, it was lucky that we had only very few cases in these forward hospitals for, on April 14, i.e. only eight days after the attack began, we heard at the base that orders had been received to evacuate the advanced base area, which included the forward hospitals, and that a general retreat to the Thermopylae Line was to take place. The Greeks on our left who, for nearly a year, had held off the main Italian Army and indeed had driven it back had, at last, had to give in to the overwhelming masses of men and modern equipment of the invading German Army.

The orders to evacuate were urgent. It was to be immediate. That is, only patients and personnel, with whatever valuable equipment could be carried by hand, were to go. The orders were received about midnight on the 14th. Transport had to be arranged and communication by telephone was very bad indeed. That is always the difficulty in these emergencies. You know exactly what you want to do but you find you cannot do it because of difficulty of communication. However, the hospital people found that an ordinary train was available in Larissa and they had it moved to Demerle and placed all their casualties on stretchers in it and themselves and their equipment wherever they could find space. The hospital at Volos was lucky too for the local commander requisitioned a sailing ship in the harbour and they got away their sick and some equipment intact and the remainder of the personnel was sent down the line on lorries.

In addition to these two hospitals there were also two C.C.S.s which were further forward. The Australian one at Ellasona was ordered to clear its casualties to the British C.C.S. back at Larissa and to retire behind the Thermopylae Line.

Thus the British C.C.S. was the only medical unit left in the advanced base, apart from the field ambulances which were retiring along with the forces they served. The orders given to this C.C.S. were to remain behind as long as wounded

were coming in, even at the risk of capture by the enemy. It was soon the only unit of any kind left in Larissa for this Advanced Base was evacuated by all troops about April 15 or 16. It had laid in a stock of rations but no more could be supplied as the ration stores had also been evacuated.

Evacuation by hospital train, however, was going on, one of the three British hospital trains coming up daily.

When the troops left Larissa the railway employees also left and soon there was nobody to service the train at Larissa. Loading of casualties, watering and firing of the engine had to be done by the medical staff of the trains. After a few days we received a message, brought by the train from the C.C.S., to say that they were now short of rations and medical supplies, so a hospital train was loaded up with these and sent off. The Greek driver refused to go further than Lamia, about half way, and it looked as if the train would have to stop there, but the M.O. often used to travel up on the engine and he had watched the man driving it so he took it up himself. This he did on subsequent days, too, getting back 100 cases a day until the C.C.S. was emptied. As soon as it was empty, the C.C.S. came back and joined the Australian C.C.S. in the Thermopylae Line.

Here a delaying action was fought for over a week. Casualties were brought back by ambulance train, by ambulance car and by lorry or anything going back empty to the base hospitals at Athens. Many times the railway line was bombed and blocked causing delay to the train or necessitating unloading on to ambulance cars.

The hospitals in Athens soon filled up and became crowded beyond the limits of expansion. To relieve this we opened a camp in tents on a beach near the docks and to this we sent all the milder cases from the hospitals so as to leave more beds for serious cases. This camp had nearly 1,000 in it and could have gone on expanding to another 1,000 if we had needed it. We staffed it by personnel from front line units which had closed.

Towards the end of the month we were told to clear out of Greece altogether. Things were pretty bad by this time. The docks at Piraeus the port of Athens had been badly damaged very early in the campaign by the nightly bombing which went on. On the very first day a mine-dropping aeroplane dropped a mine on an ammunition ship lying in the docks with the most disastrous results. The ship exploded and blew the dock sheds to bits and scattered burning debris all over the harbour. Ships caught fire from this or from burning oil running along the surface of the water. I saw the place only the morning after, with the sea still blazing with burning oil and numbers of ships on fire all over the harbour. A small part of the quay was, however, still usable and we got a hospital ship into it which took away a good number of casualties. After that no more hospital ships were allowed to come to Greece and we were left with 2,000 or so casualties in our hospitals, with something like 200 nurses. These had to be got away somehow. A ship due to sail on the evening of the 25th from Piraeus was able to take on about 100 with a number of Sisters and M.O.s. This, however, was bombed and sunk before it left the harbour but luckily the casualties were few although the C.O. of the Australian Hospital was killed and the C.O. of the British

Hospital wounded. This put a stop to any further evacuation from the docks and therefore stopped evacuation of bedridden cases altogether.

We could not leave behind for the Germans any man who could get on board a ship and so M.O.s were told to collect every man who could walk, no matter what his disability, and to prepare him for evacuation by ordinary ship. These men were all taken down one afternoon to a beach to the south of Athens and 1,500 of them were collected in the shelter of the olive trees. After dark, the transports which had been detailed for the purpose came close up to the beach and took them off in small boats. We left over 300 seriously wounded cases behind in Athens. These were all, however, too seriously ill to move and could not help themselves in any way. About one-third of the male staff of the hospital was left behind to look after them.

We next had the problem of Sisters to deal with and had to decide whether to leave some of them behind with the serious cases or not. I knew of no preceding evacuation in which Sisters were involved. It was a difficult decision to make. All of the cases left behind were very ill and much in need of nursing but were we to leave British and Australian nurses behind to be captured for certain by the Germans? How would the Germans treat Army nurses as prisoners? We did not know. We did know, however, that in the course of a month or two the British casualties we were leaving would have recovered or would no longer be in need of nursing. Was it justifiable to leave British nurses for several years in prison camps when their job would be over in a couple of months?

We decided to get them away and we *did* eventually get them *all* away on a cruiser just a few days before the Germans came in. We had sent them down to a beach during the day, hiding them under olive trees and then, when darkness fell, a cruiser came inshore and took them off in small boats.

But the patients were not after all left without nurses. The Greek D.M.S. sent me 80 Greek V.A.D.s on the day our own nurses left, another example of the kindness so frequently met with from the Greeks at that time. They knew we were leaving them to the Germans but they still were grateful for the attempt we had made to help them in their struggle. These Greek V.A.D.s had been specially selected for the job, all who knew any English being chosen. This happened about three days before the Germans came in to Athens. We still had troops north of Athens, fighting delaying actions so as to let the majority of the troops get away from the beaches in safety. The plans for their "get-away" were pretty well the same for all the beaches, of which four or five had been chosen at widely separated intervals on the southern coast, each beach being used on three or four successive nights until all troops had been evacuated. Luckily for us the moon was low at this period and the nights pitch black. The plan was that the troops assigned to a certain beach were brought up by day to the nearest place to it where they could lie up under cover. At nightfall the idea was that they should proceed to the beach in silence and get on board launches or lighters or small boats which would convey them to transports waiting out at sea. No equipment other than a small pack was to be carried because of lack of space on the ships.

In order to be ready for discovery and consequent attack, e.g. by air, we had arranged dressing stations both in the "lying-up" area and on the beaches, which were formed by the medical personnel of each unit embarking. Every casualty who could walk was to be evacuated. Those who could not were to be left with a minimum of personnel to look after them. Their capture was certain and it was hoped that they would be evacuated by the Germans to the nearest hospital.

In the end it turned out that casualties were not so bad as we expected. At most of the beaches there was no attack at all and it was only at Kalimati in the extreme south, and after the arrival of Germans on the spot, that there was any fighting. Here it was severe and some 200 wounded were collected in the local Greek hospital and had to be left.

I myself came away from Athens with the last of Force H.Q. We were told at 4 p.m. one day to start off at once and join up at Naplion about 100 miles to the south with the rest of H.Q. at 7 next morning. We set off in the evening by car and soon joined the procession of cars all making for the south of Greece. It was not, I am afraid, a very inspiring journey and it was depressing to think that we were leaving the Greece we had come to defend to be taken by the enemy. Now and then we came across bands of Greek soldiers, tired and forlorn, making their way back to their homes from the front to try to get on to their farms as civilians before the Germans came and captured them as soldiers. Here and there were groups of dead horses lying with their legs in the air by the roadside where they had been shot to prevent their being used by the enemy. Everywhere the roads were lined with wrecked motor transport, our transport, hundreds of cars and lorries driven purposely over the embankment to break them up.

Darkness fell and we followed the dismal procession southwards over the Corinth Canal to the town of Corinth which had just been raided and whose burning houses lit up the whole scene. Past Corinth we drove through the night with not a light to guide us but finding our way by following the dim whiteness that marked the road. Rough cobbled stones underneath the wheels told us we had arrived at Naplion and with it to the end of the story.

There was no difficulty about our evacuation. We lay up in olive groves all day hidden from the Germans flying overhead and watching them bombing the quays and the roads. Now and then a bomb would come fairly near and we crouched in our ditches trying to make ourselves as small as possible. As soon as night fell we marched down to the jetty, which was still intact after the bombing, and got on board a ship, just as if we were going on a Sunday excursion. There was no bombing, no casualties, no hurry and not even darkness to hinder us, for the flames from a burning transport in the harbour lit up the decks as we arrived and acted as a beacon as we left, for the time being only, the land we had come to defend.

THE CONTROL OF MALARIA.
EAST AFRICA COMMAND, 1940-1943.

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THE East African operations were carried out by a comparatively small number of troops ; but the areas in which troops were to be found were, by contrast, very large. During these operations and later the health of soldiers has had to be safeguarded over half the length of Africa. In common with other preventive activities malaria control had to be undertaken under conditions so variable that they covered almost the whole range of malarial endemicity in Tropical Africa. It is felt that an account of the particular problems encountered and of the methods employed to overcome them, of the mistakes made and of the lessons learnt, may be not only of interest but also of value to those similarly occupied in other regions. Malariologists will, it is hoped, condone the repetition of much that is familiar to them.

We desire to emphasize that, in dealing with malaria as with other biological problems, there can be little uniformity and we have not forgotten therefore that many of our conclusions may not be directly applicable without modification or transposition to other areas or other conditions.

ENDEMICITY OF MALARIA IN EAST AFRICA.—There are great variations in malariousness in the area covered by this report ; from malaria-free areas to those which are as intensely malarious as any part of the world. Owing to the changes in altitude on steep slopes there may be great differences in endemicity within distances of only a few miles.

Some areas are malaria free because they are too high (and the mean temperatures therefore too low) for malaria transmission. These include considerable tracts in the central African highlands of Kenya and a large proportion of Central Ethiopia, together with lesser areas in Tanganyika and Madagascar.

There are equally large areas in the northern part of Kenya and the greater part of Somalia (including eastern Ethiopia), which are so dry and hot that anopheline breeding does not occur or is present in the near neighbourhood of permanent rivers or for a short season near seasonal streams and rainpans. Typical of the first of these is the Juba River in southern Somalia and, of the second, the series of small streams running off the escarpment in British Somaliland.

At the other extreme are those areas in which mean temperatures are moderate and rainfall well distributed and in which malaria transmission goes on for a large part of the year. The whole of the east coast of Tanganyika and Kenya, together

with the east coast of Madagascar, comes into this category as also does most of Uganda and central Tanganyika.

Parts of the Central African Plateau some distance from the equator have a much more seasonal type of malaria except in the neighbourhood of large rivers. Such seasonal malaria occurs both in Northern Rhodesia and along the Rift Valley in Central Ethiopia. There is a similar belt of seasonal malaria which fringes the malaria-free highland regions and this in turn imperceptibly merges into the fully hyperendemic country at the lower and warmer levels. There are also some comparatively small areas, at or near the equator, in which well marked seasons of rainfall result in a partially epidemic type of malaria.

Spleen rates in nearly all the areas in which malaria has been a problem are of the order of 60 to 100 per cent, although these might be a reflexion either of epidemic, or more truly hyperendemic, types of malaria.

ANTI-MALARIAL ORGANIZATION.—In the earlier period of the war there were only two individuals available who had any wide experience of malaria and anopheline control. Such a deficiency was hard to make good for malariologists can only be made by experience. The difficulty was met by calling upon biologists, chiefly entomologists in other branches, whose general background made them capable of teaching themselves. The officers are now made up from such biologists together with medical officers who have volunteered for this work.

A large part and, in the earlier days, a preponderating part of control has been carried out under the direct supervision of specialist units known as Mobile Malaria Sections. These have come to contain three elements: African labour, semi-skilled Africans and Europeans.

A small nucleus of skilled oilers has proved to be a necessity under certain circumstances when new areas are entered and when it is necessary to establish control rapidly; dependence on fatigues or on civilian labour is generally a failure, for one reason or another, when any large area has to be controlled.

Educated Africans, recruited into the E.A.A.M.C. and specially trained to an increasingly high standard, have provided the class of Malaria Assistants. After their preliminary training, which lasts three to four months, they are capable of searching out the breeding places which matter, of understanding simple sketch maps, of searching for adult *Anopheles* and of supervising oilers. A few months later they are capable of doing much more than this and it is hoped in time to train the better ones to the level of carrying out simple surveys and running simple controls without immediate European supervision. In any case a European, reinforced by half a dozen such men, is capable of carrying out a survey in a matter of hours which would have taken him days if working single handed. This is particularly the case when working in broken country or in dense bush or forest. Similarly the execution of control work is greatly facilitated when the immediate supervision can be left to such African subordinates although there must always be the European driving force behind them and at their side.

European N.C.O.s have varied greatly in technical ability: from Ph.D. to Foundry Hand. All have done good work but it has been found that a good general education, up to something approaching matriculation standard, is essen-

tial for the majority of those who are to carry their weight in the varied activities of such small technical units. Given such an educational background it has been found possible to teach men recently arrived from Britain sufficient about the practice of anopheline control, identification of *Anopheles* and field surveys for them to be able to enter units as useful reinforcements within a period of weeks.

Units composed of these four elements break up easily into small detachments consisting of a European N.C.O. with or without an officer, 4 or 5 African Malaria Assistants and a couple of oilers with a sufficiency of simple entomological equipment, pump sprayers and oil. These detachments are capable of carrying out surveys and initiating control as and where necessary.

Had a sufficiency of trained personnel existed during the more active phase in East Africa such small detachments could have played a very valuable part by moving forward with the smaller formations and advising and directing the necessary anti-malarial measures immediately malarious conditions were encountered. With the resources of manpower available it was possible to cope efficiently only with the large formations and more or less fixed camp areas during the earlier stages of the East African campaign.

More recently unit anti-malarial squads have been trained and have begun to play a fuller part in the control of malaria.

MALARIA SURVEY.—The great variation in the circumstances of malaria transmission, which has been so summarily described above, and the paucity of information available proved again and again the absolute necessity of acquiring information in detail both from the available literature, by local enquiry and by actual reconnaissance in the field.

Any substantial reduction in malaria can be effected among troops entering new country only if they, and the malaria units accompanying them, go forward forewarned and forearmed against the malarial hazards. Only too often security of operations was obtained at the expense of security of health and, in spite of every effort on the part of the malaria units to anticipate probable moves, information withheld from the medical organization meant casualties to the fighting soldier. On several occasions European units were completely incapacitated by malaria on account of their ignorance of the risks involved in their occupation of a given area.

Accuracy in the results of survey is essential if troops are to have confidence in the recommendations of their malaria advisers, the avoidance of unnecessary warnings being nearly as important as the discovery of real malaria hazards. After their experience in the preliminary stages of the East African campaign, the standard of surveys made by the Mobile Malaria Units was high.

LOCATION OF INFECTION.—Although infections have been acquired all over the command and under every type of circumstance it has been found that the great bulk of those that are preventable are acquired as the result of certain well defined conditions.

It is true that only a very partial degree of protection can be provided for troops actually engaged with the enemy in forward areas; but the difficulties of

any sort of control under these circumstances were offset by the absence for the time being of a local infective population and by the movement of the troops themselves ; any infectivity which they set up being left behind for those who followed. Whether for these reasons or on account of less obvious ones, there have not been many examples of high malaria rates being acquired by first line troops in forward positions. More often such units did experience severe malaria when they settled down in a bad site near to water and native villages.

More permanent camps have, owing again to bad siting, produced high malaria rates ; but, since the anti-malarial organization has become adequate in size, it has hardly ever been found impossible to reduce European malaria incidence within a few weeks to less than 100 per cent per annum. As an anti-malarial organization became effective, permanent and semi-permanent camps have contributed substantially to the malaria incidence for short initial periods only.

By far the greatest sources of infection have been and remain, first, the lines of communication and, second, isolated detachments and small units for which it is uneconomic to provide larval control. It is always difficult to obtain the construction and maintenance of staging posts to even the simplest standards. Without staging posts, the really suitable camping sites soon become fouled and, in any case, since convoys have to collect their own water, they camp near to water which usually connotes a malarious site. Travel by train is also a steady source of infection for trains stop at night at malarious stations and it is often impossible to erect nets owing to lack of space.

With each successive wave of immigrants to the tropics, likelihood of the occurrence of cases has increased, not because they were more susceptible but because they were more careless or untaught either by precept or experience.

MALARIA INCIDENCE.—The only cases of malaria for which records are available for the force as a whole are those admitted to hospitals, field ambulances and so forth. There is therefore an addition to be made, of cases treated in unit lines, to most of the incidences given hereafter and it is unfortunately a variable addition, depending on the circumstances of the unit concerned but chiefly upon its stability and whether or not it has carried a R.M.O. This additional factor probably does not exceed 25 per cent, over and above the rates given, except in the case of exceptional and isolated units and is generally a good deal lower than this. It is certainly less than 10 per cent in the case of Europeans. In the following tables the figures given as "admissions" do not include this addition : an "incidence" is believed to include all cases.

The malaria admissions for the whole force are shown in Table I. While the European rates include a varying proportion of "clinical" malaria, that is cases not diagnosed microscopically, this proportion is very much greater in the rates for "All Races," in some units approaching 100 per cent. In fact a considerable proportion of African "malaria" is not attributable to malaria at all, representing, on the contrary, various other conditions, sometimes accompanied by the finding of parasites, which may be no more than an accompaniment in the fully immune African. It is for this reason that only European rates are given in illustration of the effects of control work carried out.

TABLE I.—E. A. FORCE—MALARIA ADMISSIONS PER 1,000

	<i>Europeans</i>		1940	<i>All races</i>	
	1941	1942		1941	1942
January	11.37	13.29		9.00	7.78
February	9.45	15.31		8.04	7.06
March	11.14	11.80		10.88	5.93
April	11.10	12.81		8.64	6.31
May	28.37	13.92	8.25	14.80	8.47
June	30.31	18.40	14.05	15.17	9.32
July	37.96	13.36	23.55	14.71	8.76
August	25.20	11.48	12.30	12.72	7.80
September	12.23	9.02	5.65	6.43	6.35
October	10.91	47.20	4.50	5.77	12.17
November	14.56	11.19	7.50	6.62	5.05
December	9.55	10.62	6.35	4.86	5.99
			82.15		
Annual	212.15	188.40	Say 110	117.64	90.99

During 1941 the anti-malarial organization began to play an effective part and, in 1942, there was little of the Command which was not covered by the operations of the Malaria Sections. Thus although during 1942 there was a complete redistribution of the Force, what had been a majority in non-malarious or slightly malarious country changing to a majority in malarious or highly malarious country, a substantial reduction in malaria rates occurred as compared with 1941. Attention is drawn to two features of Table I. The months of May to August 1940 and 1941 show a definite seasonal rise, attributable to the Central African epidemic season, in particular to the Nairobi area; 1942 had a rather smaller epidemic than 1941 and it is impossible to say to what extent this was responsible for the lower rates incurred by the Army during the epidemic months. The second notable feature is the high European rate for October, 1942. This was entirely attributable to cases occurring among United Kingdom troops operating in Madagascar who, in spite of previous experience of serious malaria, still were improperly clothed and had bad anti-malarial discipline. Although they were taking suppressive treatment this did not make up for their indifference to the other measures which they might have used. Europeans in East African units, both at this time and later, had rates which were very much lower than those of the Imperial units although they were not given suppressive treatment.

Although the African does contribute a large share to the total malaria admissions shown in Table I, two experiences have shown to what a small extent malaria, even of strains which are presumably alien, matters to him when he is fully immune. The West Africans who came to this Command in 1940 actually had lower admission rates than the East Africans: this is probably in part attributable to the admixture of non-immune tribes among the latter. East African battalions in Ceylon (in which diagnosis was very carefully controlled and only true cases of malaria included) have had an annual incidence of only 2.6 per cent. These battalions consisted almost entirely of immunes whereas other East African units which contained a greater proportion of non-immunes had an incidence of about 7 per cent in the same areas.

Cape Coloured South Africans contributed largely to the rates in 1940 and

1941, partly because they were so susceptible but also because they were mostly drivers. Reference has already been made to the importance of convoys as a source of malaria and it is believed that these Cape Corps drivers frequently acquired malaria at the rate of 1 per cent per day. More recently rates of 10 per cent per month have been found among the European personnel of convoys and, owing to the rapid dispersal of such convoys, it is probable that this represents only a third of the actual number of infections acquired.

The comparatively low endemicity of the northern part of this command is illustrated by the admission rates shown in Table II. In many places no malaria is acquired and, in others, only a little. In spite of this low endemicity, Europeans of a South African division stationed in these dry areas had, in the first three months of 1941, an incidence of 1·7 per cent and their Cape Coloured drivers 3·2 per cent.

TABLE II.—EUROPEAN—MALARIA ADMISSIONS NORTHERN AREAS.

		Monthly	Rates per cent Quarterly	Monthly
1942	March	0·48		1943 0·42
	April	0·28		
	May	0·57	1·33	0·55
	June	0·44		
	July	0·65		
	August	0·48	1·57	
	September ..	0·28		
	October	0·79		
	November ..	0·37	1·44	
	December ..	0·43		
1943	January	0·59		
	February ..	0·36	1·38	
			Annual 5·72	

TABLE III.—EUROPEAN MALARIA ADMISSIONS NAIROBI AREA.

		Monthly	Rates per cent Quarterly
1942	April	0·70	
	May	0·85	
	June	1·53	3·08
	July	0·45	
	August	0·39	
	September ..	0·32	1·16
	October	0·21	
	November ..	0·14	
	December ..	0·17	0·52
1943	January	0·48	
	February	0·21	
	March	0·19	0·88
			Annual 5·64

The admission rates for the intermediate zone, as typified by the region around Nairobi, are shown in Table III. The figures given are those when the camp areas were under control. During 1940, which was a bad epidemic year.

the malaria rates were double or treble those here shown and the local rates are reflected in the high total force figures for July of that year. Although the annual rates are the same as those of the Northern Areas (where little or no larval control is undertaken) it may be noted that the months of April to June account for over half the annual rate. In Northern Rhodesia where, during the epidemic season of 1941/42, little effective control was in operation the annual rate for 1942 was about 32 per cent. In Nyasaland, a 68 per cent incidence occurred during four months of the malaria season.

TABLE IV.—EUROPEAN—MALARIA INCIDENCE PORT REITZ.

				Monthly	Rates per cent Quarterly
1942	May	..	..	6.7	
	June	..	..	2.6	
	July	..	..	2.5	11.8
	August	..	..	1.3	
	September	..	..	0.6	
	October	..	..	0.3	2.2
	November	..	..	0.7	
	December	..	..	2.1	
1943	January	..	..	4.6	7.4
	February	..	..	0.7	
	March	..	..	2.4	
	April	..	..	3.8	6.9
	May	..	..	7.2	
	June	..	..	4.5	
				Annual	28.3

Rates in the coastal area are of a very different order and they are illustrated in Table IV which is believed to represent a substantially accurate total incidence. There is a seasonal rise in two seasons of the year which is perhaps exaggerated by the contrast between the fully effective control of permanent or semi-permanent breeding places and the difficulty of ensuring an equal effectiveness when rain puddles are abundant.

An A.A. regiment in the same neighbourhood had, in the last six months of 1940, an admission rate for malaria of 26.4 per cent, part being in well controlled, others in partially controlled, areas. No rigid comparison, if any, can however be made between these figures.

Such coastal areas are difficult to control with a high degree of efficiency by temporary measures alone. The same is true of the following examples yet, in both, the total malaria incidence has been kept down to a level which, while not insignificant, is not enough to interfere seriously with the efficiency of units. Suppressive treatment was only used for a part of the forces in Madagascar during the first three weeks of August and the first half of October and not at all either in Port Reitz or Ceylon.

In the case of Madagascar, Table V refers to two to four brigades and the epidemic season runs from December to June. The high rate in October has already been referred to in the discussion of the total force figures. No assistance to malaria prevention has been given by existing controls nor by the occupation

TABLE V.—MADAGASCAR EUROPEAN MALARIA INCIDENCE.

				Fortnightly	Rates per cent Quarterly
1942	August	8		0.73	
		22		0.56	
	September	5		0.49	
		19		0.94	
	October	3		2.01	
		17		2.54	
		31		1.24	8.51
	November	14		0.85	
		28		0.96	
	December	12		0.88	
1943		26		1.00	
	January	9		1.29	
		23		2.04	7.02
	February	6		2.52	
		20		2.10	
	March	6		1.84	
		20		1.73	
	April	3		2.60	
		17		1.62	12.41
	May	1		1.54	
		15		1.53	
		29		1.44	
	June	12		0.77	
		26		1.08	
				10 weeks	6.36
				Total (11 months)	34.30

of urban areas which are on the contrary the most dangerous from the point of view of infective anophelism. Much has depended on the efficiency of personal protection and adult killing, supported by larval control where possible.

TABLE VI.—CEYLON EUROPEAN MALARIA INCIDENCE.

				Monthly	Rates per cent Quarterly
1942	April	.. ..		2.7	
	May	.. ..		4.2	
	June	.. ..		4.9	11.8
	July	.. ..		1.3	
	August	.. ..		1.6	
	September	.. ..		2.5	5.4
	October	.. ..		3.0	
	November	.. ..		2.5	
	December	.. ..		2.9	8.4
				Total for 9 months	25.6

Although this command was in no sense responsible for the control in Ceylon. Table VI (referring to one brigade) is quoted by courtesy, as the same methods were applied here against a different vector and under different conditions but still have been successful in effectively controlling malaria rates in an area of high endemicity.

APPLICATION OF MEASURES OF CONTROL.—The foundation of any reduction in malaria incidence in the Army by any method is the existence in all ranks of what may be called "malaria mindedness." By this is meant awareness of the

risks which malaria carries to the individual and, to the unit, awareness of the possibilities of its control and awareness of the part which each individual has to play in this control. A frequent experience has been the difference in attitude (and in consequence the relative freedom from malaria of their units) of officers with previous African or other experience of malarious places and those without. Some officers and units have learnt only by sometimes bitter experience.

CAMP SITING.—Officers are mentioned in particular since they have the greatest part to play in what is the most important single anti-malarial measure, namely good siting. Even the most junior officer may be involved at times in the choice of site. While it is established that *Anopheles* may have a flight range of many miles, the factor of dispersion greatly reduces infestation with increasing distance from main centres of breeding. Accordingly it has been a not uncommon experience that the movement of a unit for a distance of perhaps only a few hundred yards from such main sources of *Anopheles* has reduced a high malaria rate by half or more. The point which we desire to emphasize in this connection is that there are always, within the worst area, parts which are less bad and that there is always open to the majority of a unit a choice of site, even if this be only within a circumscribed area.

The most common example of bad siting has been associated with the search for water : rather than have the trouble of fetching drinking water for half a mile or so and walking to the bathing place, units have again and again and again, acquired much malaria by making their camps beside streams and rivers. In the dry country in the north of Kenya, there was an additional attraction beside rivers, namely that the best shade was to be found there ; but even in much better watered country, and particularly among U.K. troops recently arrived in Madagascar, the same mistake was made. This is now a mistake that is rarely made except in the case of small convoys and, for them, the only effective solution is the provision of staging posts at which tired drivers can find water and fuel and proper latrines ready for them.

A more specifically military attraction in riverine sites is the overhead cover which they usually provide. A notable example of the feasibility of combining the conflicting requirements of escape from malaria and escape from air observation was provided by a division camped along the Tana River. Here it was found perfectly possible to move camps a mile back from the river, with its intense anopheline infestation, and yet to find sites which, with a little additional camouflage, provided perfectly adequate air cover among admittedly less dense vegetation.

Half a mile and, whenever possible, one mile from obvious main breeding places have been laid down as minimal distances and this has proved a reasonably sound working rule. A similar avoidance of native villages (owing to their child population of gametocyte carriers) has been more readily adhered to owing to the other complications which nearness to a native village may cause.

The only other general considerations with regard to camp siting on which stress has been laid are that the site itself should be reasonably well sloped, that camp construction should interfere as little as possible with the natural drainage

and that artificial drainage should be led into natural stormwater channels. It is not commonly realized that, in the presence of a rain water breeder such as *A. gambiae*, track discipline is as important from the anti-malarial standpoint as from that of air observation, for the abundance of anopheline breeding that can be produced by rain filled car tracks has to be seen to be believed.

The importance of expert medical advice with regard to camp siting in the tropics cannot be over-emphasized and, of all considerations to be taken into account in this connection, malaria is paramount. The kind of expert needed therefore is essentially the malariologist and one who has as much local knowledge and experience as possible. Time and again the Malaria Sections have been called upon to carry out controls under conditions in which control could not be efficient with an obviously better site in the near neighbourhood. Given a free hand the malariologist has always been able to find a site in which little control work was required or one in which control could be made thoroughly effective. The education of executive officers to an understanding and acceptance of these principles has been a long and painful process but it has in the end been substantially achieved. It is evident that there are circumstances in which operational considerations must be paramount; but the co-operation of a wise commander has invariably led to the selection of a situation in which the problems remaining were not beyond the resources available.

(To be continued)

DYSPEPSIA AND THE SICK PARADE: ONE HUNDRED AND FORTY-ONE CASES IN AN ARMoured REGIMENT.

BY CAPTAIN D. G. AITKEN,
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MOST of the recent literature dealing with illness in the Services has been concerned with the analysis of hospital cases, thereby presenting a picture that is incomplete in that it omits a record of cases as first seen by the unit Medical Officer.

The following analysis of Service cases of dyspepsia may be of interest, therefore, as it is written from the point of view of the Regimental Medical Officer of an active unit.

This unit, from which all cases were drawn, is a Regiment equipped with tanks. It was formed a little over two years ago as an entirely new unit, being formed mainly of intakes straight from civilian life round a nucleus of regular soldiers. Only those men graded physically as A 1 and mentally in the higher intelligence groups were accepted on the strength of the unit.

The period under review dates from March, 1941, to February, 1943, inclusive, covering two complete years. During the whole of this time the unit was under my medical care and the strength of personnel available to go sick (i.e. discounting from full strength those away on leave, courses, etc.) remained between five and six hundred.

To readers who are unfamiliar with the Regimental Sick Parade it might be explained that a soldier is free to go sick at any time but usually reports on the sick parade held every day. He may, however, be ordered to appear before the Medical Officer by any of his officers. The greater number of those reporting at parade is made up of men who have some minor complaint which makes the performance of full duties difficult for them. Major illness forms a comparatively small part of total sickness. In his consideration of each case the R.M.O. must assess the man's capabilities of performing duty and may award him return to full duty or to light duty of a specified nature or off duty altogether. Any soldier taken off full duties must report to the R.M.O. daily unless he is "bedded down."

In this analysis only the number of times a man reports sick of his own free will is recorded and, so far as dyspeptic cases are concerned, the figures refer only to the number of times these cases reported with dyspeptic symptoms.

My early experience with dyspeptics in the regiment prompted me to take a full history in every case and complete records of these cases have been maintained throughout the two years under review. All cases which obviously were not transitory were carefully observed in their reactions to treatment and I did not hesitate to have non-responding cases investigated further at a hospital.

Comparing the attitude to sickness of the conscript to that of the regular, I find that the conscript dyspeptic willingly reports sick and is usually keen to

undergo further investigation. The regular shows a distaste for appearing sick at all and attempts to postpone hospital investigation: nevertheless, he reports a great number of times, most frequently unofficially and at odd times, but if these occasions are noted as they were in this unit, the resultant figures are of definite interest (see below). Along with the regular the non-organic dyspeptic in whose case there is a recognizable neurotic factor also reports a great number of times but he usually chooses to appear on the normal Sick Parade.

During the period under review 3,154 new cases of all types voluntarily reported sick. Of these 212 (6·7 per cent) were regarded as gastro-intestinal and this group reported a total of 456 times, as charted below. This chart gives their ultimate diagnoses as returned from the hospitals making the investigation.

Number times reported sick		Gastro intestinal	Whether further investigated		Ulcers	Chronic inflammation	Neurotic factor recognized		Others
			No	Yes			Yes	No	
Once	..	112	111	1	—	1	—	—	—
Twice	..	49	28	21	11	1	2	4	3
3 times	..	29	7	22	4	6	2	9	1
4	..	6	2	4	2	—	—	2	—
5	..	3	—	3	2	—	—	1	—
6	..	1	—	1	1	—	—	—	—
7	..	1	—	1	1	—	—	—	—
8	..	3	—	3	2	—	1	—	—
9	..	2	—	2	—	2	—	—	—
10	..	3	—	3	—	1	2	—	—
11	..	1	—	1	—	—	1	—	—
12	..	2	—	2	—	—	2	—	—
Totals	..	212	148	64	23	11	10	16	4

The highest incidence of ulcer is in those cases reporting twice only, suggesting that the clinical assessment alone leads to an early recognition of organic dyspepsia and that the decision that further investigation is necessary is arrived at early in the course of the disability. Of the 8 cases reporting four times or more, 6 were regular soldiers. The frequency of reporting sick of the non-organic dyspeptic with a neurotic factor present will be noted.

Other factors which have a bearing on this analysis are:—Location of unit, age, duration of illness, previous occupation, present occupation, hospital facilities.

LOCATION OF UNIT.—Of the twenty-four months under review the unit spent sixteen in requisitioned buildings in or near towns and the remaining eight in hutted or tented camps usually remote from any town. Comparing figures for sickness in the different localities:—

				Town	Camp
Percentage unit reporting sick per month—all causes	..	..	..	19·3	24·3
Percentage reporting sick with gastro-intestinal symptoms	..	..	..	1·01	2·26
Percentage reporting sick with gastro-duodenal symptoms	..	..	..	0·79	1·14

The incidence of ulcer cases remained the same for town and camp at one case per month average.

These figures show, in camps, an increase in the incidence of gastro-intestinal

and gastro-duodenal cases out of proportion to the increase in total sick. Conditions that may be regarded as contributory to this rise are :—

Diet and Cooking.—Actual rations vary little for the two different types of locality. Military exercises, with their packed and tinned rations and irregular times of meals, are more frequent in camp areas. Cooking facilities are normally better in towns. Also available are meals served outside the unit and it is found that dyspeptics readily take advantage of these facilities if they are able to afford them.

Incidence of gastro-enteritis.—As would be expected the figures for gastro-enteritis in camps exceed those for towns. The disease is practically limited to camp conditions and, in my opinion, is the chief factor responsible for the increase of dyspeptics in camps, as noted above. This higher incidence in camps does not affect the chronic dyspeptic rate.

Water Supplies.—Supplies in camp are usually obtained from the nearest town mains but may be found locally and purified as necessary by the unit. At this particular time local Public Health Services failed to find any potential cause of gastro-intestinal upset in the local purified water.

AGE.—The average age of gastro-intestinal cases and of cases which were further investigated is 30 years. That of ulcer cases is 31·2 years. Other data appear later in this report.

DURATION OF ILLNESS.—All cases in which peptic ulcer was diagnosed gave a history dating well back into civilian life in the case of conscripts and for an average of 4·7 years for regular soldiers.

PREVIOUS OCCUPATION.—Of the 64 cases investigated at hospital (see below), 35 showed a positive diagnosis of ulcer, chronic gastritis or duodenitis. The remaining 29 showed negative diagnoses. Listed by civilian occupation :—

Occupation	Positive	Negative
Regular soldiers	9	5
Vehicle drivers (including travelling salesmen, etc.)	3	5
Labourers	2	2
Clerks	1	4
Others, sedentary	2	3
Others, active	3	1
Not known	15	9

PRESENT OCCUPATION.—The incidence of gastro-intestinal upset in drivers and other members of Tank Crews—drivers form a large proportion of this type of unit—as against sedentary and comparatively inactive workers is identical.

HOSPITAL FACILITIES.—In all locations of this unit hospital facilities have been good and readily available though only in the present location, with the proximity of a Gastric Centre, have exceptionally thorough methods of investigation been available. Full advantage of these facilities has been taken for the accuracy of diagnosis has made the correct handling and disposal of dyspeptic cases easier. The time taken for investigation of dyspeptic cases at the Centre was short compared with other hospitals, affecting thereby a considerable saving in man-hours. The proximity of the Centre did not affect, as might be expected, the number of dyspeptics reporting on parade : in fact, I found that as dyspeptic

cases were weeded out and disposed of correctly there was a steady decline in the proportion attending.

STATISTICAL RESULTS.

The diagnoses charted here are those returned from the hospital making the investigation. Classification of the non-ulcer cases cannot be included as certain hospitals where gastroscopy was used diagnosed gastritis on endoscopic findings; in others the diagnosis was either never made or made on clinical grounds alone. Therefore no attempt has been made to separate, in the non-organic group, those cases with an obvious neurotic factor as this group probably includes many cases of gastritis.

Chart I lists cases in the month they first reported sick but it must be appreciated that the diagnoses resulting from hospital investigations were those eventually reached, such investigation having not necessarily taken place in the month of first reporting sick. Nevertheless, those cases listed in October, 1942, to February, 1943, were investigated during this period, i.e. when a Gastric Centre was available.

The gastro-intestinal cases listed in Column C include epidemic diarrhoeas but such a complaint occurring in a previously known dyspeptic, as was occasionally the case, is not listed as a new case. Indeed, gastro-intestinal symptoms of epidemic diarrhoea could not always be differentiated from similar symptoms arising from another cause.

Cases marked as "referred for investigation" include all real medical cases but not such groups as ophthalmic, dental, etc. Hospitals include Military, E.M.S. and C.R.S. types, though in fact all the gastric cases hospitalized were admitted to E.M.S. hospitals and all but two cases investigated for dyspepsia attended E.M.S. institutions.

ANALYSIS.

	12 months ending Feb. 1942	12 months ending Feb. 1943	Total for complete period
New cases, sick, all types	1,452	1,702	3,154
Gastro-intestinal cases	84	128	212
Gastro-duodenal cases	65	76	141
Hospital investigations, all types	154	264	418
Hospital investigations, dyspeptics	37	27	64
Hospital admissions, all types	116	174	290
Hospital admissions, dyspeptics	32	22	54
Total ulcers diagnosed	18	5	23
Total ulcers, gastric	5	2	7
Total ulcers, pyloric	8	0	8
Total ulcers, duodenal	5	3	8
Chronic gastritis, duodenitis	3	8	11
Non-organic dyspepsias	14	12	26
Medically Boarded, all types	45	97	142
Medically Boarded, dyspeptics	21	12	33
Discharged Army, all causes	18	21	39
Discharged Army, dyspeptics	12	9	21

Examination of these figures shows that, for a small rise in total sick in the second twelve months as compared with the first twelve months of the period, there has been a slight increase of gastro-intestinal cases. This rise can be

CHART I.

Column	H	C	D	E	F	G	H	J	New cases				Chronic				K	L
Month	New cases		Abdom. gastric	New investigations or admtd. hosp.		Att. specialist		Total	Gastric ulcers				inflamm.				Gastric cases eventually Disch'd Army	
	All types	Abdom.		All types	Gastric	All types	Gastric		G.U.	P.U.	D.U.	F.D.	Ntl	Other	Boarded	Army		
1941																		
March	78	6	6	8	3	8	3	2	1	1	1	1	1	1	1	2	2	2
April	88	9	5	11	4	11	3	2	1	1	1	1	1	1	1	2	2	2
May	94	3	3	13	2	12	2	1	1	1	1	1	1	1	1	2	1	1
June	110	3	1	12	2	11	1	1	1	1	1	1	1	1	1	1	1	1
July	176	11	8	9	0	8	0	0	0	0	0	0	0	0	0	0	0	0
August	115	12	12	8	5	6	4	2	2	2	2	1	1	1	1	4	3	3
September	138	8	6	9	7	9	6	2	2	2	2	1	1	1	1	4	2	2
October	146	6	4	14	3	8	3	1	1	1	1	1	1	1	1	2	1	1
November	150	7	6	16	3	9	2	1	1	1	1	1	1	1	1	1	1	1
December	32	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942																		
January	145	8	7	17	5	13	5	4	2	1	1	1	1	1	1	4	4	4
February	180	10	7	37	3	21	3	2	2	2	2	1	1	1	1	2	2	2
Total	1,452	84	65	154	37	116	32	18	5	8	5	3	4	10	2	24	19	19
1942																		
March	194	11	8	17	3	3	1	0	0	0	0	1	1	1	1	2	1	1
April	94	9	7	11	6	7	4	0	0	0	0	2	1	2	1	1	1	1
May	97	9	8	16	1	13	0	0	0	0	0	1	1	1	1	1	1	1
June	97	6	6	14	1	8	1	0	0	0	0	1	1	1	1	1	1	1
July	103	5	3	18	2	12	2	1	1	1	1	1	1	1	1	2	1	1
August	80	0	0	28	0	20	0	0	0	0	0	0	0	0	0	0	0	0
September	79	19	5	24	1	16	1	1	1	1	1	1	1	1	1	1	1	1
October	137	18	11	28	4	23	4	1	1	1	1	1	1	1	1	1	1	1
November	264	15	3	35	2	27	2	0	0	0	0	1	1	1	1	1	1	1
December	181	13	11	28	1	16	1	0	0	0	0	1	1	1	1	1	1	1
1943																		
January	208	11	7	30	2	17	2	1	1	1	1	1	1	1	1	1	1	1
February	168	12	7	15	4	12	4	1	1	1	1	1	1	1	1	1	1	1
Ttl. 1942-3	1,702	128	76	264	27	174	22	5	2	0	3	8	6	6	2	9	2	2
Ttl. 1941-2	1,452	84	65	154	37	116	32	18	5	8	5	3	4	10	2	24	19	19
TtIs. 1941-3	3,154	212	141	418	64	290	54	23	7	8	8	11	10	16	4	33	21	21

This list gives no indication as to when any case was admitted hospital, investigated, etc. All cases are listed in the month they first reported sick and Columns E onwards refer only to eventual disposal, diagnosis, etc.

CHART II.

Year	Month	Percentage veg. reporting sick for 1st time	Percentage sick reporting with G.I. symptoms	Percentage G. I. sick being gastric	Percentage sick further in- vesti- gated	Percentage sick hospital- ized	Percentage centage in- vestigated	Gastric cases per- centage in- hospital- ized	Percentage eventually diag. ulcers	Percentage sick requ. Board	Percentage months boardings being gastric	Percentage months discharges being gastric
1941	March	16	7.7	100	10.2	10.2	37	37	2.50	—	—	—
	April	18	10.1	55	12.5	12.5	36	27	2.30	1.1	—	—
	May	19	3.2	100	13.8	12.8	15	17	1.06	2.1	—	100
	June	20	2.7	33	10.9	10.0	17	9	0.90	2.7	33	100
	July	29	6.3	72	5.1	4.5	—	—	—	2.8	100	75
	August	19	10.2	100	5.3	4.0	62	68	1.33	2.7	67	50
	September	23	5.6	75	6.5	6.5	77	66	1.45	1.4	50	—
	October	24	4.1	66	9.6	5.4	21	37	0.67	1.4	100	100
	November	25	4.6	85	10.6	6.0	19	22	0.68	2.0	100	50
	December	5	3.2	—	—	—	—	—	—	12.4	—	—
	January	25	5.5	86	11.7	8.9	29	38	2.75	6.2	44	66
	February	31	5.5	70	20.0	11.7	18	14	1.11	6.1	27	100
Average		21	5.9	70	9.7	7.7	28	28	1.23	3.4	43	45
1942	March	28	5.6	72	8.7	1.5	18	33	—	5.2	20	4
	April	19	9.5	77	11.6	7.4	54	57	—	4.2	50	50
	May	19	9.3	88	16.4	13.4	6	—	—	7.2	28	50
	June	19	6.2	100	14.4	8.4	7	12	—	2.0	50	100
	July	20	4.9	60	17.4	11.6	11	17	1.03	10.2	—	—
	August	16	—	—	35.0	25.0	—	—	—	17.4	—	—
	September	11	10.0	62	30.0	20.0	24	61	0.79	23.0	11	28
	October	22	13.2	61	20.0	16.0	14	17	0.72	9.6	15	15
	November	42	5.6	20	13.2	10.0	5	7	—	3.4	—	50
	December	29	7.2	76	15.4	8.7	3.6	6	—	2.2	25	—
	January	33	5.3	63	14.2	8.1	6.5	12	0.48	1.4	33	—
	February	27	7.1	58	9.0	7.1	26	33	0.58	1.8	—	—
1942-3 Average		24	7.0	61	17.1	11.4	14.6	21	0.30	7.3	15	24
1941-2 Average		21	5.9	70	9.7	7.7	28	28	1.23	3.4	43	39
1941-3 Average		23	6.7	65	13.4	9.5	21.3	25	0.76	5.4	29	31
												37

accounted for by the fact that the unit spent six months in town billets and six months in camps in the second twelve months, compared with ten months in town and two months in camps in the first twelve months. The same reason probably accounts for the increase in chronic inflammatory disease although it will be noted that the figures for non-organic dyspeptic cases remain at about the same level for both years. As would be expected, all figures for ulcer incidence fall in the second year, due to elimination of these cases from the strength of the unit.

In the same comparison there is a marked rise in the second year of cases investigated and hospitalized, denoting an increased activity on my part in attempting to maintain absolute fitness in the unit, as it was in the second year that the possibility of the unit being sent to a theatre of actual warfare became great. This possibility became a probability at about the middle of the second year and the reaction is shown by the rise, from an average figure for the first year of 9·7 per cent of all sick per month who were further investigated at hospital, to a maximum figure in August, 1942, of 35 per cent. The percentage of all sick who were medically boarded rose from an average figure of 3·4 per cent per month in the first year to a maximum of 23 per cent for the month of September, 1942. These figures returned to their normal levels at the end of the whole period when the likelihood of going overseas dissolved.

Of the 3,154 new cases reporting sick in the whole period, only 6·7 per cent (212) were classified as gastro-intestinal and 4·5 per cent (141) as gastro-duodenal. Of the 141 cases in this series regarded as dyspeptic, 64 or 45 per cent were further investigated at hospital and 23 or 16·3 per cent were shown to have peptic ulceration. Given as a percentage of the 64 cases investigated these peptic ulceration cases form 36 per cent, a figure which bears comparison with the average figure given in earlier papers on cases investigated in hospitals, e.g. the figure of 28·5 per cent shown by Gill, Berridge and Jones in their analysis of 217 Service cases of dyspepsia. Carrying comparisons with this paper further and giving figures from it, we get :—

Peptic ulceration in the duodenum	12·4 per cent	23·9 per cent.
Peptic ulceration in the pylorus	12·4 per cent	2·3 per cent.
Peptic ulceration in the stomach	11·4 per cent	2·3 per cent.

The marked difference in these figures is not readily explained though it is reasonable to suggest that the more thorough methods of investigation instituted by Gill, Berridge and Jones give, as is quoted in their paper, a higher degree of clinical accuracy in the case of duodenal ulceration. It will be noted that the addition of my figures for peptic ulceration of both the duodenum and pylorus gives a total of 24·8 per cent, which approximates closely to the figure of 23·9 per cent, suggesting that differentiation of diagnosis of ulcer lesions in the pyloro-duodenal region is markedly variable. It is worth noting here that all the cases of pyloric ulceration recorded in my series were diagnosed between April, 1941, and February, 1942, and this diagnosis was not made after this date; during this period all investigations were carried out at two Yorkshire hospitals. The Gastric Centre already

referred to examined 11 of the 64 cases and found ulceration in 3, chronic inflammatory changes in 4; the remainder being functional or negative.

Further comparison with Gill, Berridge and Jones' figures for age yields :—

Average age in duodenal ulceration	29.9 years	30.0 years.
Average age in pyloric ulceration	32.3 years	29.2 years.
Average age in gastric ulceration	31.6 years	39.0 years.

These figures show a low age group for gastric ulceration but I would point out here that the average age of the unit is about 31 years, and the average age of all cases investigated is 30 years. This unit average age results from a number of age figures which vary little from the actual average age and it would be improbable if not impossible to arrive at as high a figure as 39 years for any group of men in the unit. In other words, Gill, Berridge and Jones have drawn their cases from a much wider age group.

Chronic inflammatory disease formed 17.1 per cent of my 64 cases investigated at hospital. The figures for gastritis and duodenitis occurring as isolated entities, or as accompanying other disease, are not regarded as sufficient to warrant examination.

Non-organic dyspepsia was returned as a diagnosis in 40.6 per cent of the cases in this series and, of these, 38.5 per cent were regarded as being functional in origin. Of the functional cases half were regular soldiers.

SUMMARY.

(1) Analysis is made of all cases reporting sick in an Armoured Regiment, covering a period of two years with special reference to those suffering from dyspepsia.

(2) The dyspeptic cases formed 4.5 per cent of the total number reporting sick. Of these 45 per cent were referred to hospitals for further investigation. Thirty-six per cent of these were found to have gastro-duodenal ulceration while 17 per cent has gastro-duodenitis.

(3) Appreciation is shown of the work done by a Gastric Centre during four months of the period under review and particularly of the speed and accuracy of diagnosis by this Centre, with the resultant benefit to the Regimental Medical Officer by the rapid elimination from the strength of the unit of unfit personnel.

REFERENCES.

GILL, BERRIDGE, and JONES (1942), *Lancet*.

COMPO-COOKERY IN A CASUALTY CLEARING STATION WITH THE B.N.A.F.

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To feed troops well is to go a long way towards obtaining the best results from them as soldiers. Interest and initiative are required if the maximum benefit is to be derived from the ration as issued and it is the duty of every officer to ensure that his men are as well fed as rations and prevailing circumstances will permit—the proper feeding of the troops, then, is an integral part of man-management.

In the Army to-day, we are faced with various ration scales, each designed for different circumstances. Not the least interesting is the "14 man compo-pack ration," put up in nine different varieties, weighing 65 lb. and occupying 2 cubic feet of packing space. This ration is so designed that small numbers of men can live well even when they have cooking facilities below average as, for example, in front-line positions.

In the early days of the North African Campaign all units drew rations in this form—Base, Lines of Communication and Corps troops as well as front-line troops.

While it may be reasonable to expect, perhaps even condone, a degree of wastage by troops in front-line positions and inevitable that monotony must result when varieties of pack are not available, there is neither reason nor justification—and certainly no place—for the lazy cook who, haphazard, tips the contents of all meat tins into the "stew," day after day, and pours the vegetable liquors down the drain.

There is equally no place for the officer who lacks the interest and initiative, or fails to take the time, to think out how best to plan the weekly diet sheet and to see that his instructions are carried out.

This article shows how well, in practice, a unit can be fed; and it should be placed on record that not only the weekly diet sheet, but the food as served in the unit under consideration, soon became a by-word in the area although the unit was located under true Field conditions and without buildings or any other form of amenity.

GENERAL CONSIDERATIONS ON THE COMPO-RATION.

The routine practice of kitchens need not go by the board :—

(1) All fat should be saved and clarified daily. There is much in the meat tins, especially ox-tail, and more with the bacon. It has been shown that the tinned haricot ox-tail will give $\frac{1}{2}$ pound dripping per 14 men. There is margarine in plenty and to spare. There is sufficient fat in the sausages to allow of frying and grilling. If merely heated in the tin, sausages and bacon will tend to come to the table tepid with much congealed fat which is then wasted because it is unpalatable.

(2) There is vegetable water in quantity. This contains a high proportion of the vitamin C and should be decanted for mixing with gravies or serve as a basis for the "stock pot." The vegetables are also more attractive when served strained; if necessary through a perforated tin where no colander is available.

(3) There is fruit juice also to be saved for use in sweetening and flavouring; this is most important "salvage" where the diet contains no sugar other than that mixed with the tea and milk powder.

(4) Though flour is lacking, broken biscuit can be minced and crushed to provide a biscuit base, most useful in cooking and essential in keeping down waste.

Thus cooking, as distinct from heating, can be carried out except where the military situation precludes it. The compo-ration as heated in the tin is only good, moreover, while circumstances prevent too close an examination into the possibilities of what might really be done with it. As soon, however, as pressure eases, it is inevitable that one and a half sausages, with biscuits and margarine and tea, seems not too sustaining a breakfast, whether one is working out of doors or in an office. Then thoughtful planning is required.

It became evident also that unless the troops were gradually weaned from the general excellence of the compo-ration and served from time to time with extemporized dishes using the "left overs," not only would much wastage occur but lack of practice and loss of initiative would augur unfavourably for the quality of feeding on a change to bulk rations. Cooks can literally descend to the level of tin-openers and they must be stimulated to flights of fancy in the handling of these tinned contents, so eliminating monotony from their work with beneficial results to all.

COMPO-RATIONS IN A MEDICAL UNIT.

It was clear from the first that this ration had great possibilities in relation to unit and patients' diets and the avoidance of waste.

(1) Considering the unit aspect, full use of the biscuit ration seemed of first importance. Some men do not want all their biscuit as such while others, by nibbling throughout the day between meals, may well eat more than their share and certainly more than they require. Such wastage can be overcome and.

indeed, in these same biscuits is the flour so universally required in all forms of cooking yet certain to go to waste in quantity for lack of intelligent use.

The soldier's antipathy to rissoles, fish cakes and baked puddings, which he usually describes as "swill," can be eradicated if the cook is really conversant with his job. By skill it is also possible to allay suspicions that the improvised dish deprives the soldier of what he thinks is a better example of the culinary art and, in this way, may effect economy while at the same time providing variety, so difficult when different packs are not perhaps available.

Planning of the Diet Sheet entails much thought while, in a unit of any size, considerable time is spent in breaking down the 14-man packs and opening tins. In the Steward's Store the following system was adopted and is put forward as a means of simplifying a duty which has caused much heart-burning in units.

(i) Tiers of shelves are constructed from compo-boxes and are headed successively :—

Breakfast to-day.	Breakfast to-morrow.
Dinner ,,	Dinner ,,
Tea ,,	Tea ,,
Supper ,,	Supper ,,

(ii) Opened boxes are fed into the shelves and it is then easy to see at a glance the commodities of which the meals for at least two days must consist.

After a brief experience of this type of ration it becomes a simple task to compile the diet sheet. A brief conference attended by the Messing Officer, the Quartermaster, the Steward and the Senior Cook is all that is required.

(2) Again, from the patient's point of view, this ration is excellent when bolstered up with extras to replace certain of the heavier items which must be excluded. All varieties of patients' diets were always prepared in collaboration with the Medical Specialist.

Ordinary Diets were planned from whole compo-packs in so far as the needs of the patients demanded while Light Diets were evolved in part from the rations, in part from extras, the heavier items being entirely eliminated. Other patients' diets came almost solely from extras.

Specimen weekly diet sheets, planned from compo-packs as actually issued, for unit personnel and for patients on ordinary and light diets, are given in Appendix I. In the latter cases, eggs were made available through local purchase and extras took the place of, or partly replaced, certain of the heavier items of the pack. While on this form of ration, moreover, all troops received a weekly issue of oranges through R.A.S.C. supplies. Oranges were also available through supplies and were much used in the majority of the diets evolved.

Appendix II shows thirteen recipes, all of which were regularly used, although five do not, for various reasons, appear in the diet sheets shown in Appendix I.

The quantities required per 100 men are given.

APPENDIX I.

UNIT DIET SHEET (1).

<i>Day</i>	<i>Breakfast</i>	<i>Dinner</i>	<i>Tea</i>	<i>Supper</i>
Sunday ..	Sausage and Vegetable Balls, Tea, Biscuits and Margarine	Steak and Kidney Pudding, Potatoes, Carrots, Fruit, Tea	Fish Cakes Tea, Biscuits, and Margarine	Soup and Biscuits
Monday ..	Prem Rissoles with Gravy, Tea, Biscuits and Margarine	Sliced Pres. Meat, Potatoes, Peas, Sultana Pudding, Tea	Cheese and Jam, Tea, Biscuits, and Margarine	
Tuesday ..	Sausage and Tomatoes, Tea, Biscuits and Margarine	Cottage Pie, Mixed Fruit, Tea	Sardine Paté, Tea, Biscuits and Margarine	
Wednesday	Grilled Bacon and Baked Beans, Tea, Biscuits and Margarine	Steak Pie with Crust, Potatoes, Marmalade Pudding, Tea	Rock Cakes, Tea, Biscuits, and Margarine	
Thursday ..	Sausage and Peas, Tea, Biscuits and Margarine	Pres. Meat Rissoles, Potatoes, Carrots, Chocolate Pudding, Tea.	Fish Cakes, Tea, Biscuits and Margarine	
Friday ..	Bacon and Meat Balls, Tea, Biscuits and Margarine	Irish Stew, Biscuit Pudding, Tea	Cheese and Jam, Tea, Biscuits and Margarine	
Saturday ..	Fried Prem and Baked Beans, Tea, Biscuits and Margarine	Stewed Steak, Mashed Potatoes, Carrots, Treacle Pudding, Tea	Cheese Cakes, Tea, Biscuits, and Margarine	

UNIT DIET SHEET (2).

<i>Day</i>	<i>Breakfast</i>	<i>Dinner</i>	<i>Tea</i>	<i>Supper</i>
Sunday ..	Sausage and Vegetable Balls, Biscuits, Margarine and Tea	Steak and Kidney Pudding, Fruit, Tea	Fish Cakes, Jam, Biscuits, Margarine, Tea	Cold Pres. Meat, Soup, Biscuits
Monday ..	Prem Rissoles and Gravy, Biscuits, Margarine and Tea	Pres. Meat, Carrots, Potatoes, Sultana Pudding, Tea	Biscuits and Jam, Tea	Soup and Biscuits
Tuesday ..	Sausage and Tomatoes, Biscuits, Margarine and Tea	Cottage Pie, Mixed Fruit Pudding, Tea	Fish Cakes, Biscuits, Margarine and Tea	Soup and Biscuits
Wednesday	Grilled Bacon and Fried Meat Balls, Biscuits, Margarine and Tea	Steak Pie and Biscuit Crust, Jam Pudding, Tea, Orange	Cheese Cakes, Biscuits, Margarine and Tea	Cold Pres. Meat, Soup, Biscuits
Thursday ..	Sausage and Vegetable Balls, Biscuits, Margarine and Tea	Pres. Meat Rissoles, Potatoes, Carrots, Chocolate Pudding, Tea	Rock Cakes, Jam, Biscuits, Margarine and Tea	Soup and Biscuits
Friday ..	Grilled Bacon and Beans, Biscuits, Margarine and Tea	Irish Stew, Biscuit Pudding, Jam Sauce, Tea	Sardine Paté, Jam, Biscuits, Margarine and Tea	Soup and Biscuits
Saturday ..	Fried Prem and Fried Meat Balls, Biscuits, Margarine and Tea	Stewed Steak, Carrots, Potatoes, Treacle Pudding, Tea	Cheese and Jam, Biscuits, Margarine and Tea	Soup and Biscuits

PATIENTS ORDINARY DIET SHEET (3).

<i>Day</i>	<i>Breakfast</i>	<i>Dinner</i>	<i>Tea</i>	<i>Supper</i>
Sunday ..	Prem Rissoles, Tea, Biscuits and Margarine	Stewed Steak, Potatoes, Carrots, Blanc Mange	Fish Cakes, Tea, Biscuits and Margarine	Soup and Biscuits
Monday ..	Grilled Sausage, Tea, Biscuits and Margarine	Steak and Kidney, Potatoes, Peas, Baked Rice	Jam, Tea, Oat- cakes and Margarine	Cocoa and Biscuits
Tuesday ..	Boiled Egg, Tea, Biscuits and Margarine	Thick Vegetable Soup, Custard Pudding	Sardine Paté, Tea, Biscuits and Margarine	Soup and Biscuits
Wednesday	Sausage and Tomatoes, Tea, Biscuits and Margarine	Stew M. & V., Chocolate Pudding and Jam Sauce	Rock Cakes, Tea, Cocoa and Biscuits and Margarine	Biscuits
Thursday	Boiled Egg, Tea, Biscuits and Margarine	Vegetable Stew, Baked Custard	Fish Cakes, Tea, Biscuits and Margarine	Soup and Biscuits
Friday ..	Fried Sausage, Tea, Biscuits and Margarine	Stewed Steak, Potatoes, Carrots, Pancakes	Jam, Tea, Oat- cakes and Margarine	Cocoa and Biscuits
Saturday ..	Boiled Egg, Tea, Biscuits and Margarine	Thick Vegetable Soup, Peaches and Custard	Sardine Paté, Tea, Biscuits and Margarine	Soup and Biscuits

PATIENTS LIGHT DIET SHEET (4).

<i>Day</i>	<i>Breakfast</i>	<i>Dinner</i>	<i>Tea</i>	<i>Supper</i>
Sunday ..	Boiled Egg, Biscuits, Margarine and Tea	Thick Vegetable Soup, Peaches and Custard, Tea	Sardine Paté, Biscuits, Margarine, Tea	Soup
Monday ..	Prem Rissoles, Gravy, Biscuits, Margarine, Tea	Stewed Steak and Veg., Blanc Mange and Sliced Orange, Tea	Fish Cakes, Biscuits, Margarine, Tea	Soup
Tuesday ..	Grilled Sausage, Biscuits, Margarine, Tea	Steak and Kidney, Veg., Rice Pudding, Tea	Oatcakes and Margarine, Jam, Tea	Soup
Wednesday	Boiled Egg, Biscuits, Margarine and Tea	Thick Vegetable Soup, Custard Pudding, Orange, Tea	Sardine Paté, Biscuits, Margarine, Tea	Soup
Thursday	Sausage and Tomatoes, Biscuits, Margarine, Tea	Stewed Meat and Veg., Chocolate Pudding and Custard, Tea	Rock Cakes, Biscuits, Margarine, Tea	Soup
Friday ..	Boiled Egg, Biscuits, Margarine and Tea	Veg. Stew and Potatoes, Baked Custard Pudding, Tea	Fish Cakes, Biscuits, Margarine, Tea	Soup
Saturday ..	Grilled Sausage, Biscuits, Margarine and Tea	Stewed Steak, Veg., Sliced Fruit and Jelly, Tea	Boiled Egg, Biscuits, Margarine, Tea	Soup

APPENDIX II.

(1) *Fish Cakes.*

Ingredients—Salmon, Margarine, Biscuits.

Mince biscuits and mix well with salmon, adding margarine. Mould into cakes and deep fry or bake.

Required for 100 men :	Salmon	24 tins.
	Biscuits	8½ lb.
	Margarine	½ lb.
	Salt	To taste.

(2) *Sausage "Toad in the Hole."*

Ingredients—Sausage, Biscuits, Sliced Potatoes and Baking Powder.

Mince biscuits dry. Strain and dry potatoes and then mince. Mix biscuit flour, potatoes and baking powder. Add sufficient water to make into thick paste. Pour the mixture into well-greased baking tray. Place sausages in mixture and cook in fairly fast oven.

Required for 100 men :	Sausage	10 tins.
	Dried potatoes ..	5 tins.
	Biscuits	5 lb.
	Baking Powder† ..	2 oz.
	Salt	To taste.

(3) *Preserved Meat Rissoles.*

Ingredients—Preserved Meat, Margarine, Biscuits.

Mince biscuits and preserved meat. Add margarine and mix well. Make into rissole shape and deep fry or bake.

Required for 100 men :	Preserved meat ..	20 tins.
	Margarine	½ lb.
	Biscuits	8½ lb.
	Salt	To taste.

(4) *Prem Rissoles.*

Ingredients—Prem, Preserved Meat, Biscuit Base, Eggs,* Fat for frying.

Soak biscuits overnight, mince biscuits and Prem, later adding preserved meat. Add eggs. Mix well adding enough cold water to give consistency. Make mixture into rissole form and fry.

Required for 100 men :	Prem	20 tins.
	Preserved meat ..	7 tins.
	Biscuits	8½ lb.
	Eggs*	6
	Salt	To taste.

(5) *Cottage Pie.*

Ingredients—M. & V., Biscuits, Margarine and Baking Powder.†

Strain M. & V. and put through mincer. Mix powdered biscuit, margarine and baking powder to stiff paste. Place minced M. & V. into a baking tray. Roll out paste and cover M. & V. Bake in fast oven. Serve with gravy.

Required for 100 men :	M. & V.	80 tins.
	Biscuits	4½ lb.
	Margarine	2 lb.
	Baking powder† ..	2 oz.
	Salt	To taste.

(6) *Preserved Meat Roll.*

Ingredients—Preserved Meat, Biscuits, Baking Powder† and Margarine.

Soak biscuits overnight. Mince preserved meat and biscuits. Press margarine into the mixture and add baking powder. Mix thoroughly. Make into rolls in pudding cloths. Boil from 1 to 1½ hours.

Required for 100 men :	Preserved meat	..	24 tins.
	Biscuits	..	8½ lb.
	Baking powder†	..	2 oz.
	Margarine	..	½ lb.
	Salt	..	To taste.

(7) *Yorkshire Pudding.*

Ingredients—Biscuits, Eggs,* Milk and Margarine.

Powder biscuits. Beat eggs in milk and add to powdered biscuits to make a smooth paste. Pour mixture into baking tray and bake in fast oven.

Required for 100 men :	Biscuits	..	4½ lb.
	Eggs*	..	10
	Milk	..	2 tins.
	Margarine	..	1 tin.

(8) *Pancakes.*

Ingredients—Biscuits, Eggs,* Milk, Margarine and Jam.

Powder biscuit. Beat eggs in milk and add to powdered biscuit to make a smooth paste. Grease with margarine and fry. Serve with jam.

Required for 100 men :	Biscuits	..	4½ lb.
	Eggs*	..	10
	Milk	..	2 tins.
	Margarine	..	1 tin.
	Jam	..	3 tins.

(9) *Chocolate Pudding.*

Ingredients—Biscuits, Chocolate, Baking Powder,† Eggs,* and Margarine.

Powder biscuits and chocolate. Add baking powder, eggs and margarine and mix thoroughly. Add sufficient water to make into stiff mixture. Roll in pudding cloth and boil for 1 to 1½ hours.

Required for 100 men :	Biscuits	..	4½ lb.
	Chocolate	..	3 lb.
	Baking powder†	..	2 oz.
	Eggs*	..	10
	Margarine	..	1 tin.

(10) *Jam Roll.*

Ingredients—Biscuits, Margarine, Baking Powder† and Jam.

Powder the biscuit. Squeeze in the margarine and add baking powder. Mix to a fairly stiff paste. Place in pudding cloths and boil for 1 to 1½ hours. Serve with jam sauce.

Required for 100 men :	Biscuits	..	8½ lb.
	Margarine	..	1 lb.
	Baking powder†	..	2 oz.
	Jam	..	5 tins.

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(11) *Cheese Cakes.*

Ingredients—Biscuits, Cheese, Margarine and Salt.

Powder biscuits, grate the cheese. Mix biscuit and cheese thoroughly and squeeze in the margarine. Add salt. Mix to a stiff paste. Roll to $\frac{1}{2}$ inch thickness. Cut into required shapes and bake in a fast oven.

Required for 100 men :	Biscuits	..	..	8 $\frac{1}{4}$ lb.
	Cheese	..	..	6 tins.
	Margarine	..	..	1 $\frac{1}{2}$ lb.
	Salt.			

(12) *Sardine Paté.*

Ingredients—Sardines, Preserved Meat, Margarine and Biscuits.

Soak biscuits overnight. Strain off water. Strain oil from sardines. Mince all ingredients at least three times. Serve on or with biscuit.

Required for 100 men :	Preserved meat	..	24 tins.
	Biscuits	..	8 $\frac{1}{2}$ lb.
	Baking powder†	..	2 oz.
	Margarine	..	$\frac{1}{2}$ lb.
	Sardines and Salt	..	To taste.

(13) *Tomato Chutney.*

Ingredients—Tomatoes, Beer, Apricots, Syrup from Apricots, Salt and Biscuits.

Boil beer. When boiling, add apricots chopped, syrup, tomatoes and biscuits and salt. Mix well and boil for 15 minutes. Press through sieve. Allow to cool. Place in jars or bottles.

Required for 100 men :	Tomatoes	..	...	3 tins.
	Beer	..	..	3 pints.
	Apricots	..	..	1 tin.
	Biscuits	..	...	$\frac{1}{2}$ lb.
	Salt.			

* Eggs are essential only in the pancakes and may be omitted from the other dishes noted.

† Baking powder, while greatly improving these dishes, may also be considered non-essential.

SUMMARY.

(1) The use of this form of ration in a medical unit under field conditions in a theatre of war is discussed with special reference to the prevention of waste and the maximum benefit to the soldier.

(2) Specimen diet sheets and recipes are included as Appendices.

Our thanks are due to Lieutenant-Colonel G. Crimmin, R.A.M.C., Commanding the unit concerned, to Brigadier N. Cantlie, M.C., for permission to forward this article, and to Major D. Harkins, R.A.M.C., for valuable assistance in correcting the draft.

Editorial.

THE AUSTRALIAN ARMY MEDICAL SERVICES IN THE WAR OF 1914-1918. VOL. III.

In this third volume, as the covering letter with which it is sent out states clearly, "The First World War is seen as an episode of continuing significance and interest for the human race." It is right, therefore, that it should devote its opening pages to Chemical Warfare. We do not propose to follow this excellent Chapter—which says, among many other things, that "gassing was essentially a wound"—further than to quote the Australian Official Historian as to the effects of Yperite or Mustard Gas as seen from the view-point of the last War. "The Germans used this new agent with dreadful success, masking the shoots with high explosive. . . . Masks would have to be worn during the whole bombardment, including sleep. Bivouacs were frequently knocked in and the ground saturated with mustard oil could not be re-occupied. . . . On the night of October 28, the 5th and 6th Batteries on Anzac Ridge were put out of action by gas. . . . On November 2 two more battery commanders were gassed and died within 48 hours. In a short tour of the support line the 25th Battalion had 6 officers and 202 other ranks gassed. One Company had to change its bivouac three times. . . . Few immediate deaths were caused: of the 1,313 cases in the (Australian) Artillery in October only 20 were quickly fatal. But the condition of the worst cases was pitiful, eyes swollen and streaming, voices gone and bodies blistered. Whole battalions came out hoarse from the effects." The photograph, showing "Australian soldiers gassed with 'Mustard' lying about near Bois l'Abbé, Villers Bretonneux, May, 1918," is a terrible illustration of the episode described and is well worth bearing in mind as an example of what may yet be possible in the present war if the unofficial truce to Gas Warfare is subsequently broken.

The next chapter is on "Mental and Moral Disorders of the War of 1914-1918." This topic is, as the author points out, "clouded by the looseness of psychiatric terminology" but, "from the point of view of military 'behaviour,' three groups may be differentiated: (1) delinquent conduct, (2) the psychoneuroses and (3) the psychoses—the last in everyday language 'insanity.'" These three groups of conduct-disorder overlap more or less widely and "the importance of this overlap can hardly be too greatly stressed. . . . The question of whether a soldier should be 'shot at dawn' as a military criminal or be discharged possibly as a battle casualty with a 'wound stripe' and war pension was determined by the opinion of a medical officer as to which side of this clinical overlap the soldier's behaviour should consign him." The Chapter is very learned and many opinions are expressed or criticized but, finally, "it must be said that the outstanding and amazing feature of modern warfare is the illustration it affords of the resilience, the power, the majesty of the human mind." The author concludes: "It was not chiefly in the domain of disease but on the plane of ordinary 'soldierly conduct,' of 'playing the game' and of 'self-help' in the daily rough-and-tumble of life, that mind and body fought with Apollyon in the Valley of the Shadow of Death."

The third chapter, on Venereal Disease, describes that almost insoluble

problem of Armies and ends with statistical data. It may be said that, for 1915, the average rate per annum of mean average strength of A.I.F. overseas, admitted to hospitals for treatment of venereal diseases, all theatres, was 84.79 per 1,000. "For the purpose of war we set loose, in some men at least, the primitive instinct of 'blood-lust'; and we should not wonder if the artificial bars that in man's social life tend to restrain or sublimate the 'sex lust' are thrown over." Colonel Raffan presented to General Howse, in 1919, a Memorandum which is epitomised as follows: "The most important question of all is the existence of large numbers of soldiers who have been treated for V.D. but who are not yet cured. It is estimated that in each of the five Divisions there are 250 soldiers who require treatment for syphilis and slightly more cases of chronic gonorrhœa. . . . This means that apart from the 2,000 now in hospital there are 2,000-3,000 men who require treatment." The treatment of syphilis still remains very much as it did in 1919. It still awaits some remedy to banish it from among us; it may yet be found that Penicillin or some other magical drug of the kind provides this for us. But, with the help of the sulphonamides, the men of the A.I.F. in *this* war ought to go back with far less, at least, of chronic gonorrhœa.

Chapter IV deals with the Influenza Pandemic of 1918-19. What a terrible tragedy was there! We recall vividly the early mild pandemic in the summer of 1918, almost universal but unconnected with any considerable mortality, and the later plague which assailed us in the Autumn and Winter, carrying off so many that had been spared in the cataclysm of war or that had not, as yet, entered it—each case commencing with the mildness characteristic of typical influenza, but, in at least half, suddenly darkening over with the livid hue of dyspnoea and passing on through a wet pneumonic process to an end which was fatal in a very large number. "Perhaps the most extraordinary feature of this extraordinary pandemic is the furious speed with which it spread itself throughout a community, a locality, and the globe." The American Official History is quoted: "That an epidemic wave once developed is spread by contact of cases is of course incontrovertible. But that the widespread, practically simultaneous increase in the rates that was observed not only with this wave but also with all the preliminary and recurrent waves of the pandemic could have been accounted for by transmission from case to case of a common source seems incredible." Of the cyanosis Sir Wilmot Herringham wrote: "I have never in my life seen anything like the picture presented. Entering a ward you might see six or eight of these cases, some heliotrope as it has been called, others really purple, yet not appearing as much distressed in their breathing as, from their colour, you might expect. . . . The condition of congestion with œdema seen in others recalled phosgene poisoning." The work of Gibson, Bowman and Conner is recalled in an appreciative manner as well as that of Rose Bradford, Bashford and Wilson. The more recent work of Laidlaw, Andrewes and others is noted and the nature of the virus accepted but, as the author says, "No link up of the ferret or swine disease with 'pneumonic influenza' can be complete which does not explain also . . . hæmorrhagic diathesis as a constant symptom, the world over, of the pandemic disease, and seen in slight or moderate cases as well as in the most severe."

With this note on Influenza we must finish our Editorial on the Third Volume of the History of the Australian Army Medical Services. The other portions, including an extensive contribution on the Australian Navy, must be studied in the original. We have been mercifully spared a repetition of the influenza pandemic so far—and we are now in the fifth year of the newest Great War—but the thing may yet occur. It becomes us to be at all times and in all ways prepared for a recurrence and a study of the Australian Medical History is no bad preparation for a resumed investigation of one of the darkest pages in our medical annals.

Clinical and other Notes.

NEWS ITEMS FROM NEW ZEALAND.

U.S. MEDICAL MEN IN NEW ZEALAND.

HIGH appreciation of the manner in which American medical officers attached to the United States Forces in New Zealand have co-operated with the medical profession in the Dominion is freely expressed by New Zealand doctors who have welcomed the opportunity of exchanging information with them. The latest example of this co-operation took place at a post-graduate medical conference of doctors in Auckland. This was the largest gathering of its kind that has been held in New Zealand for several years and its numbers were appreciably increased by the presence of Americans.

An important topic was the use of sulphonamide drugs which since their discovery have opened a new era of treatment of many bacterial infections. While the drama of remarkable cures from the use of these drugs was implicit in the discussions there was also a note of warning of the necessity of regarding them as adjuncts to good medical and surgical technique which they could not replace.

It was urged also that none of the drugs forming the group should be used except where there was specific need. Major John M. Bumstead, United States Army, dealing with the pharmacology and toxicology of the sulphonamides and Lieutenant F. A. Post, United States Army, dealing with their local and systematic use in surgery, drew attention to various dangers inherent in their use in individual cases.

There had been a growing tendency, said Lieutenant Post, for a wholesale use of what was described as the "wonder drug," which might lead to a certain amount of complacency.

He and other speakers urged that there should not be indiscriminate use in such cases as ordinary types of influenza because of danger of sensitizing the patient against the drug, thus preventing its use at some later time in the patient's career when it might be urgently needed.

Lieutenant Post said that most of the troops of the world now carried a package of sulphanilamide in powder form which they were instructed to apply to a wound as soon as received. They also carried pills containing the drug which they took through the mouth.

Lieutenant-Commander W. J. Engel, U.S. Naval Hospital, spoke of the treatment of gonorrhœal infections with the drug resulting in a high percentage of cures in from ten to fourteen days instead of from six weeks to three months. One-third of all patients treated developed sensitivity.

he said, adding his warning that the drug should only be used when there were specific indications.

ADVANCES INDICATE CAUSE OF CANCER CAN BE FOUND.

"Advances in the cancer field during the last decade give clear indication that the cause of cancer can be found, and we may confidently look forward to the day when this scourge of all the people may also be controlled," declared Lieutenant-Colonel A. W. Oughterson, United States Army, speaking during the concluding sessions of the British Medical Association Post-Graduate Conference held in Auckland, New Zealand. While he spoke thus confidently, Lieutenant-Colonel Oughterson made it clear that conquest of this disease still entails much co-operative scientific effort.

"Cancer ranks second as a cause of death," he said. "This fact alone indicates that our advance of scientific knowledge in this field has been relatively small, and that the major battle is still before us."

Investigations into the cause of cancer had undergone unprecedented activity in the last decade, he pointed out, following a new discovery by Cook and Kennedy, which had widened the horizon of cancer investigators so that allied fields of cancer work shared the enthusiasm and the funds which then became available. While it was a great step forward to know that specific chemical agents could produce cancer, the significance of this, as related to the cause of cancer in man, was a subject of present and future investigation.

Three Hereditary Factors.

Hereditary factors as a cause of cancer had been the subject of intensive investigation. In experiments with mice it had been found that strains could be developed with 100 per cent mammary cancer. From this further research had shown that there were at least three factors involved in the development of cancer of the breast: (1) heredity, (2) hormonal influences, and (3) a milk factor. Similar factors might be found in cancer of the uterus.

"The milk factor has wide implications," he said. "It thus becomes important whether it is desirable for the children of a cancer family to nurse."

New hope for cancer of the prostate was revealed by recent investigations. After discussing the scientific discoveries that had been made, he pointed out that it was now known that castration in man caused a marked regression of cancer of the prostate, with improvement demonstrated both by X-ray and symptoms.

Nutritional deficiencies in relation to cancer had been opened as a subject for research on evidence produced by Japanese scientists that if "butter yellow" was fed to rats on a diet of rice and a little carrot, liver cirrhosis followed by liver cancer regularly developed. They had also shown that if yeast or liver powder were added to this diet no cirrhosis and no cancer developed. This was the first evidence that cancer could be controlled by

diet. Other experiments proved that "butter yellow" prevented the union of the vitamins and the protein. The toxic effects of the "butter yellow" could be eliminated by providing another protein (casein), with which it linked, thus leaving the normal enzyme protein system free to act.

"If dietary deficiency is a cause of cancer," said the lieutenant-colonel, "there are again broad implications."

Again he demonstrated, with reference to various experiments, the virus ætiology of cancer had been shown to be a possibility. Rous and others had shown that a virus could be localized, with the subsequent development of cancer, and that a virus might be so modified that passage from one species to another was possible and that there might be a latent period of years before cancer developed.

For over 100 years the chief test in the diagnosis of cancer, and the last court of appeal, had been the microscope. Evidence had accumulated, however, to show that there might be little correlation between the growth and form of a tumour and its biological behaviour. One scientist, Green, who had developed a technique of transplanting cancer to the eye, suggested that surgery cured only those tumours which did not have the properties of autonomous growth—which were not biological cancers.

"While there has been a greatly increased number of investigations as to the cause of cancer in the laboratory animals," said Lieutenant-Colonel Oughterson, "there has been a dearth of investigation in man." He told, however, of an interesting survey which had been made at a hospital in America, concerning the distribution of cancer in 1,000 cases, as between male and female and ward and private patients.

Economic Factors.

"We found," he said, "that cancer of the gastro-intestinal tract had the highest ratio in the oral cavity (lip: males, 100; females, 1; mouth: males, 40; females, 1), diminishing downward until the colon, when the ratio was equal. We also found a correspondingly high incidence in the lower economic group. Thus cancer of the gastro-intestinal tract is influenced by a factor common to males and the lower economic groups—external environment. Cancer of the breast and prostate or endocrinal origin, due to internal factors, show no such difference in the economic state.

"Whether this is a dietary factor, a question of bad teeth or some other obscure factor, is not known," said Lieutenant-Colonel Oughterson. "However, there is evidence that such ætiological factors may be determined by properly correlated clinical and sociological investigations."

Invaluable information had been yielded by recent investigations, he pointed out. While the cause or causes of cancer were unknown, it showed promise, at least, of being put on a chemical basis. Fact production was

needed but there was an even greater need for the use of the facts already known. This was especially true of clinical investigation.

While medical science was focusing attention on the laboratory it must not be forgotten that the clinic has given us the only cure for cancer. While thousands of patients had been cured, science was still at the stage of trying to convince both doctors and laymen that a cure was possible.

There were four steps in the cure of cancer: (1) early recognition of symptoms by the patient; (2) early diagnosis by the doctor; (3) prompt treatment; and (4) adequate treatment.

"The doctor must be cancer conscious," he declared. "There is still a too prevalent fatalistic attitude, even among otherwise intelligent members of the medical profession. It is actually based on lack of information. Training and experience in cancer work are essential."

A SIMPLIFIED METHOD OF APPLYING THE THOMAS' SPLINT AS A FIRST-AID MEASURE.

BY LIEUTENANT-COLONEL F. A. BEVAN,

Royal Army Medical Corps.

THE method of applying a Thomas' splint as laid down in R.A.M.C. Training, 1935, has stood the test of time as a satisfactory method of applying first-aid treatment to injuries of the lower limb but it has certain disadvantages which are overcome by the method to be described below. The most important of these disadvantages are (a) the possibility of injury to the foot by constriction due to the clove hitch and (b) the number of loose—and therefore losable—parts of equipment associated with the splint.

The difference in the amount of equipment required for the two methods of application of the splint is shown in the following tables:—

<i>Standard Method</i>	<i>New Method</i>
1 Thomas' splint.	1 Thomas' splint.
1 Suspension bar.	1 Suspension bar.
1 Footpiece.	6 Triangular bandages.
3 yards flannelette bandage to form clove hitch.	1 Stick for Spanish windlass.
5 flannelette bandage slings.	1 Roller bandage or similar material for suspending splint from suspension bar.
5 Triangular bandages.	Padding for ring.
2 pieces of Gooch splinting.	
1 Roller bandage or similar material for suspending the splint from the suspension bar.	
Padding for ring.	
1 Stick for Spanish windlass.	

From the above it will be seen that for application of the splint by the standard method there are many small items of equipment which can be lost—as may frequently happen on active service.

The method of application is as follows, using only two bearers:—

(1) No. 2 Bearer maintains extension on foot.

(2) No. 1 Bearer dresses wound.

(3) No. 1 Bearer threads splint over limb.

Two narrow-fold bandages are knotted together, rolled up and fastened by one end to the top of the outer bar of the splint. When the splint is in position this bandage is unrolled over and under the bars of the splint in a spiral fashion to form the bed on which the limb lies (*see fig. 1*).

(4) Extension on foot. A narrow-fold bandage is placed with its centre over the instep, crossed behind the heel and tied in a knot under the sole of the boot. The ends of this bandage are then tied to the end of the splint and a stick inserted to form a Spanish windlass (*see fig. 2*).

(5) Maintenance of flexion and inversion of the foot. One end of a narrow-fold bandage is tied to the outer bar of the splint on a level with the foot. The bandage is then brought across the top of the foot, under the sole, and again across the top of the foot, and fastened by a turn on the inner bar of the splint. The free end of the bandage is then carried under the limb and fastened to the outer bar of the splint. To ensure that bandages do not slip, the knots of this bandage should interlock with the bandage forming the bed of the splint (*see fig. 3*).

(6) One narrow-fold bandage is passed round the limb and splint above the knee and one below the knee to prevent the limb rising off the splint.

(7) Pad the ring.

(8) The splint is fastened to the suspension bar in the usual way as described in R.A.M.C. Training, 1935.

The following tests have been carried out with this method :—

(a) Two men have worn the splint and have been subjected to very rough handling by stretcher bearers and in ambulance cars over rough ground for two hours.

The limbs remained firmly fixed in the splint.

(b) Two men have worn the splint for six hours and at the end of that time complained of no discomfort except a slight soreness behind the heel. The boots were then removed and the heels showed very slight redness where the extension bandage crossed behind the heel. In my opinion this extension could have been maintained for at least another six hours without risk of injury to the skin of the heel.

(c) One man wore two splints for three hours. On his right leg the splint was applied by the standard method and on the left leg it was applied by the new method. After two hours the right foot was very painful and the clove hitch had to be loosened, whereas the left foot was still quite comfortable after three hours. The man stated that the support given to each leg was about the same but that the left leg and foot were much more comfortable than the right. To eliminate as far as possible any prejudice in favour of the new method, an R.A.S.C. driver was chosen to be the patient for this test.

Advantages of the new method :—

(1) Elimination of the clove hitch and its dangers. If a metal skewer or calipers are used for the extension, these are only another loose item of equipment.

In the new method of extension the greater part of the pressure falls upon the thick part of the boot behind the heel.

(2) There are fewer loose items of equipment. If, for example, the footpiece

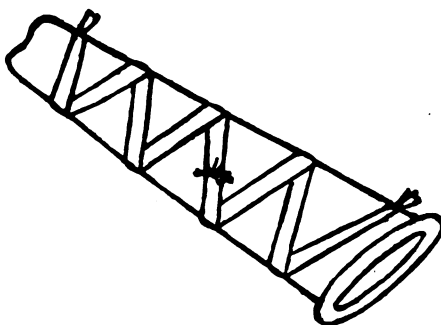


FIG. 1.

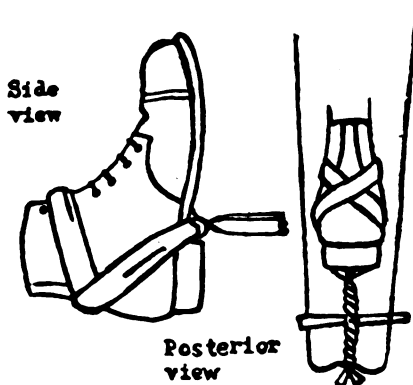


FIG. 2.

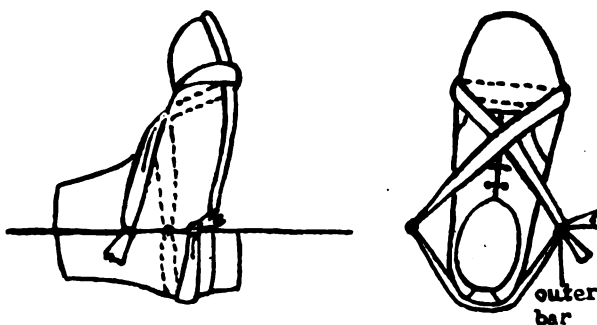


FIG. 3.

is lost, the soldier will almost certainly be at a loss as to how to fix the foot in the correct position whereas, if the new method is taught, all that is required

to keep the foot in the correct position is a triangular bandage, a handkerchief or even a bit of string.

(3) Frequently, under active service conditions, stretcher squads will consist of two men only. The splint is much easier to apply by two bearers if the new method of applying it is adopted. It takes a shorter time to apply and is easier to apply in the dark.

(4) The new method is much easier to teach and is much more easily learnt by R.A.M.C. personnel.

I should like to thank Brigadier H. C. Edwards, F.R.C.S., for his advice and encouragement and all those officers and N.C.O.s and men of the field ambulance who have assisted me in working out the detail of the method of application.

THE REGIMENTAL TREATMENT OF SCABIES.

BY CAPTAIN H. F. LUNN, B.Sc., M.B., B.S.,

Royal Army Medical Corps.

THE usual methods of treatment of scabies include bathing and full disinfection of fomites and the patient is confined to bed for at least twenty-four hours. A military case has to be evacuated from his unit. Treatment in the last war was often delayed until the disease and its complications were severe. Loss of man-power would be avoided under active service conditions if treatment could be carried out effectively while the soldier remained with his unit. Munro (1919) believed that scabies and pediculosis required similar remedial and control measures and did not approve of regimental treatment.

Treatment within a unit is possible only in cases diagnosed before the onset of secondary infection. The method employed should satisfy the following criteria: (1) Application to be effective without skilled attention; (2) Minimal interference with duty; (3) No danger of disabling complications.

INVESTIGATION.

An attempt has been made by the writer to find methods which satisfied the above criteria and to employ them on the cases seen at sick parades and skin inspections. The units from which the cases of scabies were thus obtained were four detached companies, each of approximately 200 men. The men were employed on field works and training throughout the period of the investigation.

The incidence of scabies was first observed over a period of six months and cases were treated at a Military Hospital with the usual three-day course of sulphur ointment. For the next six months all possible cases were treated within their units, either by the derris root lotion of Saunders (1941) or by sulphur

lather (Nolan, 1937). They were followed up, after completion of treatment, at routine skin inspections for a further period of six months.

PROCEDURE.

Diagnosis was made on the presence of definite burrows at one or more of the sites of election and on the characteristic rash and irritation. Patients were treated by the company medical orderlies under the daily supervision of the writer. They were given a hot bath before and after their course of treatment. They wore the same clothes during the treatment period and were allowed to continue with normal duties as long as they attended for treatment when required. No disinfection of fomites was carried out.

Fourteen cases were treated with derris root lotion, three with full-strength, the remainder with the half-strength lotion suggested by Saunders (1941). On an average, eight applications were given to each case, two on the first day and three on two successive days.

Seven cases were given one gramme of sulphur powder applied daily to the skin incorporated with either hard or soft soap lather. The average number of such daily applications was three. This form of treatment was advocated by Nolan (1937) and has been recently used by Carter (1941).

RESULTS.

There was no significant change in the incidence of scabies while treatment was being conducted within the units concerned or during the following six months. There seems to be no danger of epidemic spread of the disease as long as the men do not pool their blankets and sleep together.

With the derris root treatment, the relief from irritation was dramatic. Scrotal dermatitis was severe when the full-strength lotion was used but was not troublesome with the half-strength lotion. A few cases developed a persistent skin hypersensitivity.

Dermatitis was more frequent with the sulphur lather cases but was more generalized and less intense than that due to the derris lotion. There were no cases in which skin hypersensitivity persisted.

The relief from irritation and diminution of the skin lesions obtained with both methods proved to be deceptive. If the cases had been followed up for only four weeks, both methods might have been considered entirely successful. On examination, most cases at that time had no irritation and the rash had disappeared, leaving only the brown pigmented areas which follow the healing of the deeper excoriations of the skin. Relapses were recognized by the return of the rash and irritation and by the appearance of new burrows. The average time for the failure of treatment to become clinically apparent was nine weeks, the periods varying between five and twelve weeks. Mellanby (1941) found that a similar period elapsed before the disease was recognizable clinically in his experiments with volunteers.

Details of the results obtained are given in the adjoining table.

	<i>Treatment and where employed</i>	<i>Number of cases</i>	<i>Number remaining free from infection</i>	<i>Number of relapses</i>	<i>Cases of persistent skin hypersensitivity</i>
Control Period	Sulphur ointment (Hospital)	27	26	1	Nil
Experimental Period	Derris lotion (Unit)	14	11	3	3
	Sulphur lather (Unit)	7	4	3	Nil
	Sulphur ointment (Hospital)	1	1	Nil	Nil
	Total	22	16	6	3

DISCUSSION.

Saunders (1941) and Buchan (1941) reported favourable results with derris root lotion but no reference is made to the progress of their cases after four weeks. The results from the present series are comparable to those reported by Forman (1942) who notes that "failures are only discovered when cases are followed up over a period of weeks." The observation by Mellanby (1942) that 21 per cent of the mites survive this form of treatment explains the unsatisfactory results obtained in practice when cases are followed up for an adequate period. Mellanby (1942) finds that after three daily applications of sulphur lather about 50 per cent of the mites remain alive. The relapse rate in the present series was so high that the method was only employed in a few cases.

SUMMARY AND CONCLUSIONS.

(1) An attempt has been made to treat scabies within military units by means of derris root lotion and sulphur lather.

(2) The results have not been as successful as those previously reported with these methods.

(3) Relapses after treatment were only recognized because cases were followed up for over three months.

(4) There has been no significant change in the incidence of scabies in the units concerned during or since the experimental period.

(5) The methods investigated are not considered suitable for the treatment of scabies within military units.

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REMEDIAL EXERCISES FOR BACKACHE.

BY MAJOR T. G. RANKINE,

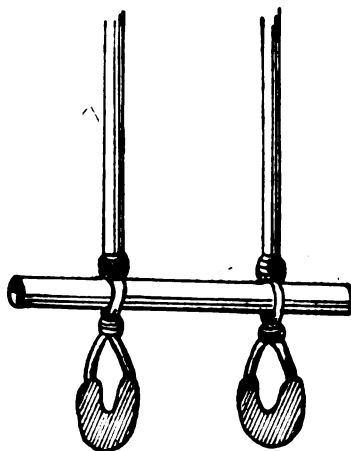
Royal Army Medical Corps.

BACKACHE—whether it be called lumbar fibrositis, lumbago, sacro-iliac strain or otherwise—figures largely as a cause of prolonged disability in the Army and to a lesser extent in all other occupations.

Treatment is often surprisingly disappointing and, when hospital methods such as manipulation, local injections, etc., have failed to bring about improvement, one is left with the more homely massage, heat and exercises with which to persevere for a longer or shorter period.

Massage and heat undoubtedly do cause at least a temporary improvement which can be appreciated readily by the patient's increased range of lumbar movements immediately thereafter. One gets the impression that, if this range of movement could be increased still farther without causing pain and spasm, then real and lasting improvement in the symptoms would follow.

Acting on the assumption that painful spasm, which interferes so greatly



with movement, would be lessened if exercises were carried out under "extension" instead of "compression," the following simple apparatus has been used in the Remedial Department of this Convalescent Depot for some time.

A stout trapeze bar, with projecting ends, is suspended from a beam. Each rope is continued below the bar to form a loop. This loop is thickly padded and is of such a length that, with the pad tucked into the axilla, the patient can also take a part of his weight by hanging on to the projecting ends of the trapeze bar above.

In this way the patient can be suspended for an appreciable length of time without undue discomfort.

The "extension" effect is of course obtained by the pull apart between the

head and shoulders, on the one hand, and the weight of the lower part of the body on the other. This is in contrast to the "compression" between the same two regions when the patient is standing up.

Having previously had radiant heat and massage, the patient is then suspended and encouraged to "hang limp." He then strives, in an increasing series of leg swings backwards and forwards, to kick the hand of the instructor held at a suitable height.

In this way the lumbar region is put through a wide range of movement. Lateral and rotary movements are also easily performed by varying the swing of the legs.

By a counter push or pull in the shoulder region the instructor can readily increase the swing in a patient who is not co-operating well.

The results of this variation of treatment, while not theatrically spectacular, are distinctly encouraging and the simplicity of the apparatus would seem to justify its place in the Remedial Exercise Room of Convalescent Depots or other establishments where such cases are treated.

It may well be that this device, or something similar to it, is already in use but, as I have not seen any such description, I am prompted to bring it to the notice of Medical Officers who may find it useful.

Reviews.

THE FOOT (Third Edition). By Norman C. Lake, M.D., M.S., D.Sc.Lond., F.R.C.S.Eng. London: Baillière, Tindall & Cox. 1943. Pp. viii + 432. Price 15s. net.

The third edition of Mr. Lake's book on the foot contains some new material, particularly on gunshot wounds, trench foot and immersion foot. It will continue to be of great value to all surgeons who have to deal with disabilities of the foot. Medical Officers of the Army, in particular, are likely to obtain great assistance from it in dealing with the foot problem which is so important in the Service.

The book contains a lucid and rational account of the foot. Although Mr. Lake's views, on some of the topics discussed, differ widely from those held by the majority of orthopædic surgeons, it must be admitted that he makes out a very good case for his opinions. For instance, it appears to the reviewer that his unorthodox teaching on the shape of the normal foot, on the muscular control of the foot, on flatfoot and on footstrain, is more realistic than the accepted orthopædic opinion of the day. Thus, Lake believes that the "normal" foot in civilized races is a fairly rigid structure, with a fixed longitudinal arch of some degree, and, furthermore, that there is an evolutionary tendency to *increasing* rigidity of the foot. He does not believe that the postural activity of the muscles of the leg has any part in supporting the weight of the body; it is responsible only for balancing the body on the foot, the bones and ligaments of which are the prime supporters

of the body weight. Orthopaedic surgeons, on the other hand, believe that the natural foot is supple. They regard the fixed arch as an acquired abnormality. The arch, in their view, should be variable through a very wide range under the influence of postural and voluntary muscular contraction. These are controversial matters which have a direct influence on the treatment of flat foot and footstrain.

Throughout the book, treatment is discussed on sound lines. The standard operations are described but detailed descriptions of operative technique are not included. The new chapters on trench foot and immersion foot are excellent. They include a concise account of experimental observations on the effect of cold on living tissues. The application of this experimental work in the refrigeration treatment of gangrene is described. There is an admirable chapter on vasomotor disturbances affecting the foot.

Some sections of the book fall below the general level of excellence. Fractures and gunshot injuries are inadequately described and the directions for their treatment are not sufficiently detailed to be of any practical assistance to the reader. It is worth mentioning that the instruction, given on page 147, to immobilize the foot in the varus position after fractures of the os calcis should be disregarded. Immobilization in the varus position is *never* justified, except possibly in the treatment of spastic flat foot. The plantigrade position must be accurately maintained, i.e. the heel and the first and fifth metatarsal heads must be in the horizontal plane. Immobilization in varus leads to prolonged and perhaps permanent disability.

A curious omission occurs in the discussion of flat foot, where internal rotation at the hip joints is not mentioned as a causative factor. Postural internal rotation at this level is the commonest cause of flat foot in children and special exercises to correct it are essential in treatment.

The reviewer's general impression of the book is very favourable. It is a balanced, interesting and very intelligent account of the foot. C. G.

CHEST EXAMINATION. THE CORRELATION OF PHYSICAL AND X-RAY FINDINGS IN DISEASES OF THE LUNG. By Richard R. Trail, M.C., M.A., M.D., F.R.C.P., with a Foreword by Sir Walter L. Langdon-Brown. London: J. & A. Churchill, Ltd. 1943. Pp. x + 106. Price 10s. 6d.

This small book of 106 pages is based on a course of lectures to students and post-graduates, founded on the writer's attempts to explain and correlate physical and X-ray findings on a knowledge of applied anatomy, physiology and pathology. Its four main sections deal with Applied Anatomy, Applied Pathology, Physical Examination and the Abnormal Film, and the principle lung diseases are dealt with in separate chapters. It is illustrated freely by diagrams and by some reproductions of X-ray photographs.

The book succeeds in its object. A modern exposition of chest signs is timely and it will prove most valuable to the medical man who is obliged to report on his own X-ray films as the sections on simple interpretation of normal and abnormal

films are lucid. The classification of adventitious sounds is simple. If the interpretation of their meaning is controversial the writer finds that "it works in practice and is borne out by those same tests on which it is founded, pathological and radiographic." Uniformity in the classification of adventitious sounds is probably an unattainable ideal.

This book is recommended and the only criticism is that the writer's very clear teaching should have been illustrated by many more X-ray photographs. This fault may be corrected in another edition when conditions are easier.

PSYCHOLOGICAL MEDICINE. A SHORT INTRODUCTION TO PSYCHIATRY. By Desmond Curran, M.B., F.R.C.P., D.P.M., and Eric Guttman, M.D., L.R.C.P.Ed. Edinburgh: E. & S. Livingstone. 1943. Pp. viii + 188. Price 10s. 6d. net.

This book will be of interest to many who are anxious to view the present position of clinical psychiatry. The emphasis is placed mainly on the fully developed and easily recognizable clinical entities and their treatment. This emphasis has doubtless guided the choice of plates illustrating Schizophrenia, Mental Deficiency and General Paralysis. Nevertheless attention is also drawn to the greater social problems of the maladjusted personalities, the high grade mental defectives (referred to as Morons in this book) and the Psychosomatic Group of diseases. Attempting, as they have done, to cover so wide a field within the compass of 196 pages, it is only natural that in the treatment of their subject the authors have been mainly descriptive and the student will have to search elsewhere for a dynamic approach to the problems of the abnormal personality.

TESTS FOR COLOUR-BLINDNESS. Ninth Edition. Reprinted. By Dr. Shinobu Ishihara. London: H. K. Lewis & Co., Ltd. 1943. 32 plates. Price £2 10s. net.

Ishihara's test for colour-blindness is well known as one of the most convenient and easy methods for weeding out colour-deficients. It is true that the method is not so accurate as a spectral test nor, for some purposes at any rate, so suitable as a lantern test, but for general purposes it is sufficiently accurate to allow advantage to be taken of the ease of its application and the absence of expensive and cumbersome specialized apparatus. The test consists of a series of cards printed in confusion colours, which the candidate is required to read, and its rationale depends on the accuracy of the reproduction of the various colours. It has been extremely unfortunate that the printing of such tests was entirely in the hands of Axis countries before the war and hitherto reproductions of sufficient merit have not been possible to make here. Messrs. H. K. Lewis are to be congratulated on completing a very difficult technical piece of work in a very efficient manner.

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Corps News.

NOVEMBER, 1943.

EXTRACTS FROM THE "LONDON GAZETTE."

October 14, 1943.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the Middle East :—

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Capt. Charles Whitlow Warner, M.B. (139125), Royal Army Medical Corps (Birkenhead).

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Miss Marguerite Berthe Fullalove (206140), Matron, Queen Alexandra's Imperial Military Nursing Service (Swallowbrick, Lincoln).

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Miss Mary Ann Varton Soutar (206431), Sister (actg. Matron), Queen Alexandra's Imperial Military Nursing Service (Arbroath).

To be Additional Associates of the Royal Red Cross, Second Class.

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Miss Dorothy Gwendoline Thorp (206479), Sister-in-Charge, Queen Alexandra's Imperial Military Nursing Service (Purley).

The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in the Middle East :—

To be Additional Commander of the Military Division of the said Most Excellent Order.

Brig. (local) William Douglas Denton Small, M.D., F.R.C.P. (127320), Royal Army Medical Corps.

To be Additional Officers of the Military Division of the said Most Excellent Order.

Major (temp. Lt.-Col.) Ronald Heywood Bland, M.D., M.R.C.P.I. (27870), Royal Army Medical Corps (Res. of Off.) (Dublin).

Major (temp. Lt.-Col.) Ernest Bulmer, M.D., M.R.C.P. (88685), Royal Army Medical Corps.

Major (temp. Lt.-Col.) John Badan Strickland Guy, M.B. (40285), Royal Army Medical Corps (Saltburn-by-Sea).

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Major (temp. Lt.-Col.) Vladimir Charles Verbi (41310), Royal Army Medical Corps.

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No. 7354779 S/Sjt. Gilbert Richard Hutchinson, Royal Army Medical Corps (Chilwell, Notts.).

The Military Medal.

No. 7346423 Sjt. Adam Haldane Strath Manson, Royal Army Medical Corps (Aberdeen).

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Order of the British Empire, in recognition of gallant and distinguished services in Malta :—

To be Additional Commander of the Military Division of the said Most Excellent Order.

Col. Frederick Whalley, D.S.O., T.D., M.B., K.H.P. (24268), late Royal Army Medical Corps.

To be Additional Member of the Military Division of the said Most Excellent Order.

Capt. (temp. Major) Hyman George Gillis Bernstein (111999), Royal Army Medical Corps (London, S.W.5).

The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division) in recognition of gallant and distinguished services in Malta, to the undermentioned :—

No. 7391411 Sjt. Harold Edward Fisher, Royal Army Medical Corps (Rayleigh, Essex).

The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in Malta :—

The Royal Red Cross.

To be Additional Associate of the Royal Red Cross, Second Class.

Miss Sheila Mary Gough (208336), Sister, Queen Alexandra's Imperial Military Nursing Service (Moore, Cheshire).

The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in the Middle East :—

Royal Army Medical Corps.

Capt. (temp. Major) R. W. Cope (103684).

Capt. (temp. Major) G. M. Willoughby (135591).

The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in Malta :—

Royal Army Medical Corps.

Capt. (temp. Major) (actg. Lt.-Col.) C. J. Cellan-Jones, M.B., F.R.C.S. (133957).

Capt. (temp. Major) W. O. MacFeat, M.B. (107765).

Capt. C. V. Light, M.B. (87378).

Capt. R. Mitchell, M.B. (183138).

7262729 W.O.2 (Q.M.S.) (actg. W.O.1 (R.S.M.)) F. R. Euston.

7263174 W.O.2 (Q.M.S.) J. H. Henderson.

7380636 Sjt. H. Burnley.

7391357 Sjt. H. L. Clarke.

Queen Alexandra's Imperial Military Nursing Service.

Miss K. M. Perkins (209208), Sister.

Miss H. J. Read (209151), Sister.

October 21.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Sicily :—

The Military Cross.

Capt. (temp. Major) Archibald Crerar, M.B. (70322), Royal Army Medical Corps (Millport, Bute).

Capt. Leopold Herbert, M.B., M.D., B.Ch. (101317), Royal Army Medical Corps (Belfast) (since killed in action).

Capt. Joseph Esmond Miller (163133), Royal Army Medical Corps.

The Military Medal.

No. 7266352 Sgt. Thomas Spears, Royal Army Medical Corps (attd. Special Service Troops) (Anfield Plain, Co. Durham).

No. 7348621 Sgt. Alan John Spencer, Royal Army Medical Corps (Wallington, Surrey).

No. 7389747 Cpl. James Edwin Dean, Royal Army Medical Corps (Warrington, Lancs.).

No. 7364542 Pte. Harold James Eden, Royal Army Medical Corps (London, S.E.20).

The KING has been graciously pleased to confer "The Efficiency Decoration" upon the following officers of the Territorial Army :—

Royal Army Medical Corps.

Lt.-Col. (temp. Col.) (local Brig.) A. H. Whyte, D.S.O. (36850).

Lt.-Col. (temp. Col.) A. T. B. Dickson, O.B.E. (16079).

Lt.-Col. (temp. Col.) I. M. Pirrie, M.C. (31343).

Major (temp. Lt.-Col.) (actg. Col.) A. H. Macklin, O.B.E., M.C. (35384).

Major (temp. Lt.-Col.) J. B. Forsyth (47137).

Major (temp. Lt.-Col.) R. M. Gordon (37575).

Major (temp. Lt.-Col.) A. B. Kerr (38993).

Major (temp. Lt.-Col.) W. R. Logan (40634).

Major (temp. Lt.-Col.) R. W. Power (35257).

Major (temp. Lt.-Col.) W. B. Sprunt (41717).

Major W. C. Armstrong (38014).

Major R. E. Holme (33533).

Major W. H. M. Jones (35750).

Major W. L. Lamb (37419).

Major M. Stoddart-Scott (38295).

Major C. M. Willcox (38962).

Major J. Wright (40001).

Capt. (Qmr.) W. E. Lawson (T.A.R.O.) (51053).

November 4.—The King has been graciously pleased to approve the following award in recognition of gallant and distinguished services in Sicily :—

The Military Cross.

Capt. Ivor Joseph, M.B. (118091), Royal Army Medical Corps (Rhymney, Mon.).

November 11.—The KING has been graciously pleased to give orders for the following appointments to the Most Excellent Order of the British Empire, in recognition of

gallant and distinguished services in North Africa :—

To be Additional Officers of the Military Division of the said Most Excellent Order.

Col. (temp.) John Thomas McQuat, M.B., F.R.C.S. (36018), Royal Army Medical Corps (Loughborough).

Col. (temp.) Thomas Menzies, M.B. (8428), Royal Army Medical Corps (Aberdeen).

The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division) in recognition of gallant and distinguished services in North Africa to the undermentioned :—

No. 7260995 Cpl. Francis Albert Wood, Royal Army Medical Corps (Wolverhampton).

The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North Africa :—

The Distinguished Service Order.

Col. (actg.) Malcolm MacEwan, O.B.E., D.F.C., T.D., M.D. (22266), Royal Army Medical Corps (Longbank, Renfrewshire).

The Royal Red Cross.

To be Additional Members of the Royal Red Cross, First Class.

Miss Hilda Martha Caistor (206062), Sister (actg. Matron), Queen Alexandra's Imperial Military Nursing Service (Gainsborough).

Miss Jean Ramsay (206410), Sister (actg. Matron), Queen Alexandra's Imperial Military Nursing Service (Glasgow).

To be an Additional Associate of the Royal Red Cross, Second Class.

Mrs. Violet Patience Cowley Morgan (215601), Sister, Territorial Army Nursing Service.

The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in North Africa :—

Commands and Staffs.

Brig. (local) J. M. Weddell, F.R.C.S. (18884) (Res. of Off.), late Royal Army Medical Corps.

Royal Army Medical Corps.

Brig. (local) E. R. Boland, O.B.E., F.R.C.P. (128259).

Col. (temp.) J. H. Bayley, M.C. (8621).

Col. (temp.) F. J. Hallinan, M.B. (5016).

Col. (temp.) G. K. Maurice, D.S.O., M.C. (15791) (Res. of Off.).

Major (temp. Lt.-Col.) J. C. Alexander, T.D., M.B. (22683).

Major (temp. Lt.-Col.) H. D. Chalke (87094).

Major (temp. Lt.-Col.) S. Heatley, M.B., F.R.C.S. (230705).

Capt. (temp. Major) (actg. Lt.-Col.) S. S. Chessier, M.B. (76612).

Capt. (temp. Major) F. W. Bunting, M.D. (174366).

Capt. (Qmr.) K. C. Pacey (123315).

Lt. (Qmr.) P. A. Howe (210453).

7358299 W.O.1 (R.S.M.) J. J. McCann.

7346282 W.O.2 (Q.M.S.) R. E. Hill.

7262428 S/Sjt. (actg. W.O.2 (Q.M.S.)) H. D. March.

2652556 S/Sjt. W. H. Boucher.

7361553 S/Sjt. R. H. Bull.

7522965 S/Sjt. C. E. M. James.

7376028 Sjt. M. C. Daley.

7346344 Sjt. G. A. L. Gillespie.

7375944 Cpl. (actg. Sjt.) C. Stevenson.

7390387 Cpl. F. W. R. Claridge.

867465 Pte. F. Davis.

7380482 Pte. G. Hilton.

7403454 Pte. T. P. L. Watson.

7402984 Pte. A. E. Norris.

7385671 Pte. W. L. Woods.

October 15.—Col. A. F. C. Martyn, late R.A.M.C. (4868), having attained the age for retirement, is retained on the Active List supern. to establt. Oct. 16, 1943.

Major (War Subs. Lt.-Col.) (temp. Col.) W. C. MacKinnon, M.B. (26360), to be Lt.-Col. Oct. 16, 1943.

Major W. E. Adam, M.C., M.D. (3031), reverts to ret. pay on ceasing to be re-empld. and is restored to the rank of Lt.-Col. Sept. 25, 1943. (Substituted for the notfn. in *Gazette* (Supplement) Sept. 24, 1943.)

October 29.—Lt.-Col. (temp. Col.) R. A. Austin, M.C. (8589) from R.A.M.C. to be Col. Oct. 16, 1943, with seniority from Sept. 30, 1940.

November 2.—Lt.-Col. J. R. Hayman (4831), having attained the age for retirement, is retained on the Active List supern. to establt. Oct. 31, 1943.

Major (temp. Lt.-Col.) W. I. FitzG. Powell (5871) to be Lt.-Col. Oct. 31, 1943.

November 9.—Lt.-Col. (temp. Col.) G. D. Harding, M.B. (14283), from R.A.M.C. to be Col. Nov. 10, 1943, with seniority from Oct. 8, 1940.

Major (War Subs. Lt.-Col.) (temp. Col.) G. W. B. Shaw (1786) to be Lt.-Col. Nov. 10, 1943.

November 12.—Col. (temp. Brig.) J. B. A. Wigmore, M.D. (4881) (late R.A.M.C.) on completion of four years in the rank on Nov. 10, 1943, is retained on the Active List supern. to establt.

The undermentioned short service officers are appointed to permanent commns., retaining their present seniority, Nov. 1, 1943:—

Capt. (temp. Major) G. L. Humphreys (78768). Capt. (temp. Major) G. F. Edwards, M.B. (78766). Capt. (temp. Major) H. J. A. Richards, M.B. (75433). Capt. (temp. Major) F. B. Bagshaw (51996). Capt. H. C. Jeffrey, M.B. (78767). Capt. D. A. Ireland, B.M. (78908). Capt. R. D. Bell, M.B. (78703). Capt. A. Bennett (53971).

Regular Army Reserve of Officers.

November 2.—Major L. T. Challenor (36095) ceases to belong to the Res. of Offrs. Nov. 3, 1943, and is granted the hon. rank of Lt.-Col.

TERRITORIAL ARMY.

October 19.—Lt.-Col. J. C. Adams (28491) relinquishes his commn. on account of ill-

health Oct. 19, 1943, and is granted the hon. rank of Lt.-Col.

REPATRIATED PRISONERS OF WAR.

Col. G. A. D. Harvey.

Lt.-Col. F. J. Morris.

Lt.-Col. T. A. S. Samuel.

Major J. Burns.

Major J. A. Chapel.

Major J. H. T. Challis.

Major W. N. S. Donaldson.

Major C. H. Imrie.

Major R. Mackay.

Major J. C. Steel.

Major W. E. Tucker.

Major E. R. C. Walker.

Capt. N. D. Allan.

Capt. A. D. Aveling.

Capt. E. R. Dansie.

Capt. M. Egan.

Capt. T. K. Elliott.

Capt. P. A. Forsyth.

Capt. E. M. Fraser.

Capt. R. W. Gunderson.

Capt. W. C. Harris.

Capt. I. Jacobson.

Capt. J. D. Recordon.

Capt. G. E. Stoker.

Capt. G. S. Trower.

Capt. (Qmr.) F. E. Weekes.

PRISONERS OF WAR AND MISSING.

Prisoners of War.

Capt. J. Connolly, Sicily.
 Capt. G. F. Allan, Malaya.
 Capt. R. D. Taylor, Malaya.
 Lt. T. Wilson, Malaya.

Missing.

Capt. J. Henry, Italy.
 Capt. A. McLellan, Burma.
 Lt. T. M. Park, Italy.

DEATHS.

HOPKINS.—On Oct. 26, 1943, Major Charles Hensley Hopkins, R.A.M.C., retired. Born May 29, 1870, he took the M.R.C.S. England and the L.R.C.P. London in 1896, and entered the Army as Surgeon Lieutenant July 28, 1897. Promoted Captain, R.A.M.C., July 28, 1900, and Major July 28, 1909. He retired Nov. 5, 1913, and took up the Retired Pay appointment at Devizes a few days later, where he remained till 1932, except from May 20, 1916, till April 2, 1918, when he acted as Assistant to the D.D.M.S., Southern Command. He served with the Nile Expedition of 1898, and was present at the Battle of Khartoum. He received the Egyptian Medal with Clasp and the Queen's Medal. He was brought to notice for valuable services rendered during the Great War in War Office Communique of Sept. 18, 1917.

LAFFAN.—In Torquay on Oct. 29, 1943, Lieutenant-Colonel Richard Charles Kirby Laffan, R.A.M.C., retired. Born April 4,

1857, he took the L.R.C.S.I. in 1878 and the L.R.C.P. Edinburgh in 1879. Commissioned Surgeon Feb. 5, 1881, he was promoted Surgeon Major Feb. 4, 1894, and Lieutenant-Colonel, R.A.M.C., Feb. 5, 1901. He was seconded for service with the Government of Egypt, Aug. 2, 1887, to Aug. 1, 1894. The 3rd Class of the Osmanieh was conferred on him by the Khedive for his services as Inspector of Hospitals to the Sanitary Department of Egypt, *London Gazette* July 26, 1892. He served in the Egyptian Campaign of 1882, being present at the Battle of Tel-el-Kebir, being awarded the Medal with Clasp and Bronze Star. He served on the Nile 1884-1885, receiving a second Clasp to the Medal. He retired April 16, 1904.

WALKER.—On November 16, 1943, Captain Harry Norman Walker, R.A.M.C., aged 43 years. Beloved husband of Maureen, of Grafton, Whitenap, Römsey, and only son of Dr. and Mrs. H. R. Walker, Ipplepen.



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No. 6.

December, 1943.

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FOREWORD.

THE WAR OFFICE,
LONDON, S.W.1.

14th December, 1943.

MY DEAR WHITFIELD,

I should be grateful if you would publish the following in the Corps Journal.

In the year that has just ended I have seen the work of the Medical Services in many parts of the world. It has been characterized by an efficiency in administration and execution in anxious and trying conditions which has never been surpassed. This has been achieved by hard work and ceaseless devotion to duty on the part of Officers and Other Ranks of the Royal Army Medical Corps, The Army Dental Corps, the Queen Alexandra's Imperial Military Nursing Service and the Territorial Army Nursing Service, and of the attached personnel of other Services.

I congratulate you all most heartily; your efforts are contributing in full measure to the mitigation of the sufferings of war and the attainment of final victory.

Best wishes to you all for the New Year and may success continue to crown your efforts.

Yours sincerely,

ALEX. HOOD,
Director-General, Army Medical Services.

Lieut.-Colonel C. A. Whitfield, M.B., R.A.M.C.,

Manager,

"Journal of the Royal Army Medical Corps,"

The War Office (A.M.D.2),

London, S.W.1.

Authors are alone responsible for the statements
made and the opinions expressed in their papers.

Journal of the Royal Army Medical Corps.

Original Communications.

THE DIAGNOSIS AND TREATMENT OF YAWS AMONG WEST AFRICAN TROOPS.

BY CAPTAIN W. H. H. J. DE WYTT,
Royal Army Medical Corps.

THIS paper is an analysis of seventy-two cases of yaws referred to the Yaws Clinic at a West African military hospital over a period of four months and includes a short note on the pathology of yaws ulceration. The patients were native soldiers from the Gambia, Sierra Leone, the Gold Coast, Nigeria and the Cameroons; the average being 22 years.

The following table shows the cases classified according to their main lesions :—

Primary yaws	2 cases
Secondary yaws	nil
Tertiary yaws	70 cases
(a) Foot-yaws	43 "
(b) Pustular rash	7 "
(c) Frambœsiform rash	1 "
(d) Solitary sessile plaque	2 "
(e) Ganglion	5 "
(f) Juxta-articular nodules	4 "
(g) Bone-yaws	4 "
(h) Ulcers of the lower limb	4 "

Of the above cases five had yaws of the hand as well as yaws lesions elsewhere, and a further eleven cases had foot-yaws in addition to other lesions. It was found that the presence of these concomitant lesions was a valuable aid to diagnosis when the nature of the main lesion was in doubt.

A full history was taken from every case and a definite history of yaws in childhood was obtained in seventeen cases and a doubtful history in a further eleven. In ten of the cases, with no history of infection in childhood, a history of yaws in one or both parents was obtained.

The two cases of primary yaws both gave a history of recent association with infected persons. In neither was there a previous family history of yaws. In one case the typical frambæsiom was found on the buttock and, in the other, on the eyebrow. The Kahn test was positive in both cases.

No cases of secondary rash were seen and a history of lesions suggestive of secondary yaws was elicited from only thirty-four cases.

The majority of the patients (97.2 per cent.) presented tertiary lesions, most of which were in the form of foot-yaws.

These cases of foot-yaws presented three distinct types of lesion: A hyperkeratotic type, a punctate type and the classical subdermal yaw.

The Hyperkeratotic Type—This commenced as a thickening of the epithelium along the edge of the sole forming a thick pad which, while usually confined to the posterior and lateral borders of the heel, spread forwards and covered the entire posterior half of the sole in the more severe cases. Later, the thickened epithelium began to crack, deep fissures appeared, and fragments of epithelium would come away leaving ragged holes. In some cases there was complete exfoliation of the epithelial pad so that only a thickened irregular border was left with apparently normal skin in the centre.

Punctate Type (keratosis punctata).—In these cases the sole was found to be studded with small pits 2 to 5 mm. in diameter which did not extend down to the dermal layers. They looked rather as though pieces of epithelium had been dug out with the point of a penknife. In many cases only a few were present but, in others, the entire sole was involved.

In most of the cases of foot-yaws both hyperkeratotic and punctate lesions were present. The classical subdermal yaw occurred in only two cases and presented no unusual features. All three types of lesion were tender on pressure and often occasioned considerable disability.

In thirty-three of the forty-three cases of foot-yaws a history of intermittent disability with exacerbations during the rainy season was obtained.

The diagnosis was based on the presence of "pitting," the hypertrophic epithelium, the history of exacerbation during the rains and the positive Kahn test. Many natives were found to have cracks round the heels which were, however, of a finer character than the coarse fissures of yaws and were not usually tender on pressure. Soldiers also complained of tender feet on being moved from a very damp climate to a dry one, particularly if there was much marching, and in these cases the soles frequently showed fine cracks. The history and the absence of hypertrophic epithelium made it easy to distinguish this condition from yaws.

A similar condition to foot-yaws was observed on the hands. In five cases a generalized thickening of the epithelium was found over the palms and palmar surface of the fingers associated with patches of desquamation and contracture of the little finger in some degree. In two cases the ring finger was also affected. In only one case, in which "pitting" was also present, were the lesions causing any discomfort.

The digital contracture is described as a typical sign of late yaws (Pronk, 1941)

but, in West Africa, appears to be of little diagnostic value by itself as, in a control investigation of 100 cases with no signs or history of yaws, nine showed some degree of contracture of one or both little fingers.

The pustular rash was found to commence as multiple pigmented papules about 1 to 2 cm. in diameter, which were usually confined to the dorsum of the foot, the ankle and the lower leg, although in one severe case the buttocks and lower trunk were also involved. At first smooth and shiny, the papules later developed a dull granular surface and, with the appearance of successive crops, often became confluent. Pruritus was intense and in all cases had led to scratching and subsequent widespread secondary infection. In the cases seen the condition had been present from two to ten weeks.

Infected scabies and other forms of pustular dermatitis at first caused some difficulty in diagnosis. In yaws, however, the base of the pustule was always found to be raised above the surface of the skin owing to the underlying papule, the edge of which could be seen among the pustules. The granular appearance of the skin could not have been due to scratching alone as it was never observed among the very many cases of scabies seen at the same hospital. The positive Kahn test, the characteristic distribution of the rash and the rapid response to bismuth or arsenical preparations confirmed the diagnosis. Syphilitic eruptions, of course, are not associated with pruritus and were consequently not considered as an alternative diagnosis.

One case only of frambæiform rash was seen. It resembled a classical secondary yaws rash in all particulars and would have been diagnosed as such had not the patient given a clear history of primary, secondary and tertiary eruptions at definite intervals during the past four years and had well established foot-yaws when seen.

The solitary sessile plaque commenced, in the two cases in this series, as a smooth raised area situated on the scrotum and varying from 2 to 3 inches in diameter. One of the cases also presented three smaller, almost confluent, plaques in the right deltoid area. At first deeply pigmented, the plaques soon became pink and shiny and progressed to ulceration which, in the scrotal area, was very superficial but, in the lesions in the deltoid area, the deeper layers had been involved and shallow indolent ulcers were present when the case was first seen. The process was quite slow and painless and pruritus was not a feature of the condition.

In the early stages the lesion could not be confused with any other condition except, perhaps, a keloid scar which it somewhat resembled. In the ulcerative stage, however, differentiation from syphilitic ulceration was difficult and the diagnosis was based on the presence of other yaws lesions and the lack of any history or signs suggestive of syphilis.

In this series all the ganglia were situated on the dorsum of the hand and wrist. They were all large, soft, ill-defined swellings, slightly tender on firm pressure and causing some pain on full movement of the wrist. On rolling the swelling under the thumb a soft, coarse crepitus could be felt due to the presence of numerous small solid bodies in the contained fluid.

In one case there was a clear history of teno-synovitis previous to the appearance of the swelling. •

All of the four cases were treated with injections of Sobita and the swellings rapidly disappeared although the loose bodies could be felt for some weeks afterwards.

The juxta-articular nodules presented no special features of interest. They were all small, hard, fibrous swellings about the size of a pea, usually multiple and found in proximity to the knee, wrist and elbow joints. The nodules were either freely movable in the subcutaneous tissue or attached to joint structures.

Differentiation from the nodules of *Onchocercus volvulus*, which they closely resembled, was made only by biopsy as the two diseases might easily coexist.

All the four cases of bone-yaws in this series took the form of a sclerosing osteo-periostitis of the tibiæ and fibulæ. In three of the cases both the tibiæ and the fibulæ were affected and the right tibia alone was affected in the remaining case. All the patients had several weeks history of pain in the shins, which was worse at night, and of difficulty on walking. The shafts of the affected tibiæ were very tender with some local heat; thickening of the shaft could also be felt and there was usually some antero-posterior bowing. X-ray showed sclerosis and widening of the cortical bone with narrowing of the medulla and irregularity of the periosteal outline.

These cases were classified as yaws, rather than syphilitic osteitis, chiefly on account of the presence of other yaws lesions, e.g. foot-yaws, and the absence of any signs or history of syphilis.

The four cases of yaws ulceration of the lower limb all presented similar clinical appearances. They were situated on the shin (1), ankle (2), and the dorsum of the foot (1); only one case of multiple ulceration (two ulcers) occurred. The ulcers were deep and punched-out with sharp edges and with no local œdema; the floor was composed of cauliflower-like granulations, the discharge was yellow and purulent and there was little or no slough. The Kahn test was positive in all four cases and a rapid clinical response to Sobita, without local treatment, was obtained.

There was at first some confusion between yaws and tropical ulcer. The form of tropical ulcer most commonly seen at this hospital closely resembled the ulcer described by Earle (1942) as occurring in Trinidad and was quite distinct from the yaws ulcer described above. The acute form had a raised edge due to œdema of the surrounding tissues, the walls and floor forming a single smooth velvety concave surface frequently covered by a foul-smelling greyish or greenish slough. In the more long-standing cases the appearances were somewhat similar but without the œdema and often having an everted edge. Both forms were usually very painful and showed no response to Sobita.

From syphilitic ulceration, owing to the similarity of clinical and microscopic appearances, diagnosis usually had to be based on the history and the presence of other yaws lesions.

Two cases of lingual ulcer were also admitted to the hospital. In both, the ulcer was situated in the centre of the tongue, was punched out and had a foul

black slough. In each case there was a similar smaller ulcer on the hard palate opposite the larger lesion. The Kahn was strongly positive in both cases. In neither case were there any other yaws lesions present nor were there any signs or history suggestive of syphilis. One case healed completely after two injections of NAB and the other equally quickly after two injections of Sobita. It was thought that these lesions might be an early stage of gangosa ; but because of their doubtful nature they have not been included in the series.

TREATMENT.

In this series only NAB and Sobita (sodium potassium bismuth tartrate) were used. One case of each type of lesion was treated with NAB and the remainder with Sobita. In all nine cases were treated with NAB, the course consisting of an initial dose of 0.45 gram followed by weekly doses of 0.6 gram, up to a total of twelve injections. The remaining cases were treated with intravenous Sobita, the course being twelve weekly injections of gr. i ; a higher dosage, or injections at more frequent intervals, by the intravenous route proving too toxic. The solution used was made in the hospital dispensary with a concentration of 1 grain in 2 c.c. distilled water.

The intravenous route was preferred to the intramuscular as the latter can be very painful and may render the patient temporarily incapable of full duties. The exhibition of Sobita by any route, of course, is likely to produce renal damage ; accordingly the urine was tested as a routine twenty-four hours after each injection. Albuminuria occurred in 8 cases ; in 3 cases it was persistent and necessitated a change of treatment ; in the remaining 5 cases the albuminuria was transient, clearing up after one or two days and not returning with subsequent injections. In the 3 cases in which the albuminuria was persistent it cleared up after the treatment was changed to NAB. These 3 cases are not included in the 9 cases mentioned above as being treated with NAB.

A clinical cure was obtained in all the 72 cases and the patients returned to full duties, reporting weekly for the remainder of their course. Unfortunately only 13 cases had completed the full course of injections when the investigation was interrupted by the writer being posted to another station. Ganglion and all the skin lesions, except foot-yaws, responded rapidly. With NAB a clinical cure was obtained after an average dosage of 1.75 grams and with Sobita the average dosage required was 4.2 grains. Foot-yaws often required more prolonged treatment before pain was completely relieved. Bone-yaws proved very resistant, 6 to 7 injections of NAB being required before much relief was obtained and no response at all was observed to Sobita after six weeks' treatment. Neither Sobita nor NAB had any effect on the juxta-articular nodules and treatment, where required, was by excision.

Of the 72 cases, 24 had received previous treatment. Ten had been treated as children with from 4 to 8 injections of some arsenical preparation and 14 had received treatment within the past five years. Of this latter group 9 cases had been given 4 to 10 injections of an arsenical, 4 cases had received 1 to 7 injections of intramuscular Sobita and 1 case had received a short course of each.

In all the 14 cases treated as adults there was a history of relief of symptoms followed by recurrence within one to three years. Most of these recurrences were in the form of foot-yaws.

SEROLOGICAL REACTION.

The Kahn test was used exclusively in this series and the blood was found positive in all 72 cases. The C.S.F. Kahn was done in the four cases of bone-yaws and proved negative in every instance. In 9 cases the Kahn was negative on the first test but became positive after a provocative injection. NAB 0.45 gram was used as a provocative in 3 cases and Sobita gr. i intravenously in the remaining 6. Whenever Sobita failed to provoke a positive reaction in a suspected case of yaws it was followed by an injection of NAB and in no case did the NAB succeed where Sobita had failed.

In every case the Kahn test was repeated as a routine after the third, sixth, ninth and twelfth injections; the most frequent response was an initial rise in the intensity of the reaction, followed by a fall; but in 3 cases there was a secondary rise about the ninth week of treatment. In only 2 cases did the Kahn reaction become negative after a full course of treatment; in 2 more it diminished from "four plus" to "doubtful." In the remaining 10 cases that had completed a full course of treatment the final Kahn reaction was either "one plus" or "two plus."

THE PATHOLOGY OF YAWS ULCERATION.

Evans and Knock (1943) in an examination of 17 cases of yaws ulceration found Vincent's organisms present in the smears in over half the cases. On dark ground examination of those cases in which Vincent's organisms were found they noted the presence of numerous spirochaetes which appeared to be of three different types: (a) *Borrelia vincentii*; (b) a spirochaete of the refringens type; (c) an organism morphologically indistinguishable from *Treponema pallida*.

They concluded that the presence of spirochaetes was of aetiological significance.

On pathological examination of the same series they reported the following findings:—

The granulomatous ulceration of yaws was very difficult to differentiate, both macroscopically and microscopically, from syphilitic ulceration. Macroscopically the yaws ulceration was characterized by a more vascular granulation tissue which appeared in the form of numerous tufts of healthy capillaries forming the typical heaped-up granulations in the floor of the ulcer. Histologically, the ulcers were characterized by a cellular granulation tissue which extended to the base of the epithelium and showed, in parts, varying degrees of necrosis and thickening. In the central parts the cells were closely packed together but at the margins they were more diffusely arranged. Giant-cell systems surrounded by epithelioid cells, many plasma cells, lymphocytes and a few eosinophils, without any definite follicular arrangement, were found distributed throughout the tissue but occurred more frequently in the marginal areas. Central softening and necrosis were often seen. The tissue in general showed increased vascularity with many newly formed capillaries. The arterioles were surrounded by pale and

swollen cells and showed some intimal thickening and peri-arteritis. The smaller vessels were frequently thrombosed, especially in those patients who also showed the sickle-cell trait, and a varying degree of fibroblastic reaction was found, being more marked in lesions of long-standing.

It was concluded that the degree of peri- and end-arteritis did not occur to the same extent as in syphilis and that the ulcer tissue in yaws was much more vascular with considerable regeneration of capillaries.

DISCUSSION.

The salient feature of this series is the large proportion of foot-yaws (66 per cent), reflecting as it does the high incidence of this condition among West African troops; as much as 30 per cent of native personnel being affected in some units in this area. The incidence is highest among Cameroons troops, as might be expected, since yaws is almost universal in some parts of that country (Simpson, 1938). The majority of these cases, of course, have only seasonal disability and are treated without difficulty by their unit medical officers; but it must be remembered that even so the patient is usually unfit for long marches for several weeks and that, while treatment is easily obtainable under static conditions, it is by no means so easily obtained during active operations when the physical efficiency of the soldier is of the utmost importance. Foot-yaws is thus a most important condition from the military point of view, much more important than in civilian life, for a lesion such as a seasonal recurrence of foot-yaws, which would be a comparatively trivial complaint to a civilian, under military conditions may constitute a very real disability. Theoretically no soldier should be enlisted who is suffering from yaws but, in practice, it is impossible to exclude at the medical examination those men who have no active yaws lesions at the moment but who would be liable to a recurrence during their period of military service.

The treatment recommended by most workers for yaws in adults is three injections of one of the arsenical or bismuth preparations, this amount being likely to produce a cure (Moss, 1927, Rutter, 1941), and in most West African medical units this is followed, three to four injections of NAB or up to six injections of Sobita gr. ii intramuscularly being the usual course. Medical officers, however, do not seem to realize that, although there is about 50 per cent of cures with this dosage, there is also a very high relapse rate. Moss found 46 per cent of cases showing lesions when he re-examined them five years after treatment with three injections of neosalvarsan and, in this series, no less than 24 of the 72 cases (33 per cent) were relapses, many of them having received more than the usual course of treatment.

Quite apart from the above cases, the blood-reaction in yaws is known to be very unresponsive to treatment (Dempster, 1942) and it seems reasonable to suppose that this is because the treatment is not carried out for a long enough period. A similar state of affairs obtained in the early days of the arsenical treatment of syphilis, when apparent cure after a few injections was followed later by a recurrence of the disease. We now know that the treatment of syphilis

must be continued until the blood-reaction is negative and it is probable that the same thing is true of yaws.

It should be realized that the rapid clinical cure obtained in yaws does not mean that the disease has been eradicated and that, if relapses and a further period of disability are to be avoided, treatment must be continued for a considerable period and cases should be followed up as is customary in V.D. clinics. It would be ideal of course for every native soldier suffering from yaws to continue treatment until the Kahn is negative but military conditions and the high cost of treatment may render this impracticable. In that case investigation should be undertaken to find the minimum dosage required to prevent relapse during the period of military service ; and in the meantime it would be advisable for every case to receive one full course of twelve injections either of NAB or of Sobita and afterwards to report periodically for observation.

The cases in this series are too few in number for any conclusions of value to be drawn as to the efficiency or otherwise of Sobita by the intravenous route but it would seem clear that Sobita gr. i intravenously is just as effective a provocative in yaws as NAB 0.45 gram.

SUMMARY.

A series of cases of yaws admitted to a West African Military Hospital is analysed, the differential diagnosis discussed and a short note added on the pathology of yaws ulceration. The treatment of yaws is also discussed and it is suggested that the present treatment is insufficient to prevent relapse and that it should if possible be continued until the Kahn is negative. The value of intravenous Sobita as a provocative in yaws is noted.

My thanks are due to Colonel R. C. Gordon for permission to forward these cases. to Lieutenant-Colonel J. C. Leedham-Green, R.A.M.C., for his help and encouragement, and to Major R. Winston Evans, R.A.M.C., for the note on the pathology of yaws ulceration.

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THE CONTROL OF MALARIA.
EAST AFRICA COMMAND, 1940-1943.

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(Continued from p. 222.)

PERSONAL PROTECTION.—Granting good siting, the first line of defence against malaria is personal protection which is taken to include not only the use of protective clothing during the hours of darkness but the proper care and use of the mosquito net. This is almost entirely a matter of unit discipline and, on several occasions, remarkable differences between the malaria rates of different units camped on the same site were observed; these differences were attributed to observably greater anti-malarial discipline in the one case than in the other. The most striking example of such difference was seen in Madagascar between recently arrived U.K. troops and the Europeans of East African units.

It is however necessary that nets should be suitable. Great difficulty was experienced at first in obtaining netting of sufficiently small mesh to exclude *A. funestus* which is in many areas common. Not only must the mesh be suitable but the net must be inconspicuous in colour, easily erected and small enough to be carried at all times. After many trials a rectangular net 72 by 30 by 40 inches has been found to satisfy these requirements with a fair degree of success. It is erected in a bivouac by tying the four corners to sticks cut from the bush and stuck into the ground. The long bell pattern net is, although excellent for use in hospitals, entirely unsuitable for active operations.

Nets have been issued to Africans not so much for their own protection as for that of the susceptible European with whom they are so closely associated and upon whom they are so dependent.

Little use has been made of repellents but it is evident that the development of pyrethrum jellies opens up new and great possibilities.

Where regular night duty is involved, as in the case of guards, signallers and so forth, the difficulties may be formidable. Insistence on the employment of the minimal number of men is the first essential. Protection by screening of huts or the use of a mosquito proof bivouac and frequent use of pyrethrum spray are the most valuable methods. Head nets are rarely effective in practice. It is frequently forgotten that the hours before dawn are as dangerous as the hours after dusk.

ADULT KILLING.—The second line of defence is one of attack against adult *Anopheles*. Although this method has, in civil life, had its most striking successes

in areas of seasonal malaria it has been found to be an essential feature of successful military control. It is in the first place always practicable. In camp or tent or bivouac the malaria carrying *Anopheles* attracted to man can always be attacked. In forward or base areas any unit can apply pyrethrum spraying without expert assistance. It requires no elaborate equipment and is applicable to motor vehicles, trains and ships. There can be few circumstances in which some use of this method cannot be made and it is most desirable that forward units, which may not be able to practise larval control, should reduce the adult anopheline population for the benefit of the bulk of following troops. A concentrated anti-adult control should in any case accompany the early stages of anti-larval work since there is a time lag of a good many days before the latter becomes effective. The practice has been to carry out an evening spraying at dusk, supplemented by an early morning spraying in specially malarious areas or when other methods were not available for any reason. In bivouacs such mosquito harbourages as vehicles, boxes, bundles of bedding, treeholes and patches of dense bush near sleeping places require treatment. A handspray at least 12 inches long and of 1 pint capacity is desirable, particularly for use by field units, and large tents or barrack rooms require pressure atomizers for efficient work.

Some indication of the effectiveness of personal protection and anti-adult measures alone in the reduction of malaria in a highly endemic area is given by the malaria incidence from a brigade camp. The units concerned were living in a tented camp and engaged in frequent battalion and brigade manœuvres involving a considerable proportion of night exercises. The malaria rate as estimated by the writers at the beginning of the period in susceptible persons would have been 30 per cent per month, in the absence of any protective measures, dropping to about 5 to 10 per cent at the end of the period. Larval control became effective in the middle of July as shown by the adult anopheline catches made in thirty catching stations.

The results in this camp show that the combination of personal protection and adult killing reduced malaria rates by at least two-thirds. It is probable that anti-larval methods, which were commenced on June 12, became efficient in about two weeks but did not become fully effective for about five weeks, reduced malaria rates again by a half; but it is not possible to be dogmatic about this result, or about the further reductions shown, as they coincided with a probable seasonal decline in anophelism. In similar areas, however, this fall has not usually taken place until the latter part of September.

LARVAL CONTROL.—The control of malaria by anti-larval methods has played a larger part in static camps than in forward areas. But, on the other hand, it has come to be regarded by the malaria sections more and more as a routine procedure under almost any circumstances. In fact, however difficult control may appear to be, our approach has changed from one of comparative hopelessness to one of restrained assuredness that control of malaria can be achieved; if not with 100 per cent efficiency, then with 70 or 60 or 50 per cent efficiency. Such a reduction in incidence relegates malaria from being the dominating medical consideration at least to parity with other hazards of a tropical campaign.

TABLE VII.—VECTOR ANOPHELINE CATCHES.

<i>June</i> 13 27	<i>July</i> 4 11 18 25	<i>August</i> 1 8 15 22 29	<i>September</i>	<i>October</i>	<i>November</i> 7 14 21 28
61 16	15 7 2 0	0 1 0 0 0	Nil	Nil	1 0 1 3

TABLE VIII.—EUROPEAN MALARIA INCIDENCE.

	<i>Week</i>		<i>Malaria cases</i>	<i>Monthly Malaria Incidence per cent</i>
June	6	..	1	
	13	..	3	
	20	..	7	
	27	..	15	6.3
			<u>26</u>	
July	4	..	12	
	11	..	8	
	18	..	6	
	25	..	4	6.6
			<u>30</u>	
August	1	..	7	
	8	..	1	
	15	..	3	
	22	..	2	
	29	..	4	3.6
			<u>17</u>	
September	5	..	4	
	12	..	2	
	19	..	3	
	26	..	2	3.1
			<u>11</u>	
October	3	..	2	
	10	..	1	
	17	..	1	
	24	..	0	
	31	..	3	2.0
			<u>7</u>	
November	7	..	4	
	14	..	3	
	21	..	1	
	28	..	1	2.5
			<u>9</u>	
December	5	..	1	
	12	..	1	
	19	..	2	
	26	..	1	1.4
			<u>5</u>	
			..	

The larvicide used has almost universally been oil, 1 part of solar to 10 parts of diesel fuel oil. As a result of experience, supported by experiments carried out by McMahon (1941), the use of old lubricating oil has been discouraged as, to make it effective as a larvicide, it requires so much additional toxic oil that no saving is achieved. Used oil is of value as a makeshift when no more suitable oil is available, more particularly as solar oil with which to reinforce it is often obtainable in the field.

Paris green has not been used to any extent owing, chiefly, to the fear of accidents resulting from frequent movements of units and from the employment of primitive people and partly to the absence of the type of breeding place for which Paris green is suitable.

Where pumps have been unavailable or insufficient various other methods for the application of oil have been used. Dry sawdust or rice-husks or chopped grass have been soaked in oil and sown over the area to be treated; oil balls of tow and hessian have been thrown into pools and brushing with bunches of twigs soaked in oil has been used for smaller collections of water.

The ideal of initiating control before the arrival of troops in a given area has only rarely been achieved. When the initiation of control was urgent the routine has been to commence oiling immediately over as wide an area as possible, pending the completion of survey, supplementing this anti-larval work with specially intensive anti-adult measures. If there were time the initiation of larval control should be preceded by the preparation of a sketch map (however rough) showing, as far as possible, all natural features and the main breeding places. In either case such a map is required of the area which it is considered necessary to control and, on it, the area was broken up into six daily tasks, or preferably five, in which case one day could be allowed for rest and one for repair of equipment and preparation of materials. Each of these tasks was gone over systematically by the whole gang of oilers on one day in the week. Such systematic quartering of the ground is particularly necessary when a rain water breeder has to be controlled but, in close country, it is necessary in any case.

Simple earth drainage to reduce the size of the areas of water to be oiled has sometimes been possible even in quite temporary controls and a good deal of more elaborate drainage, but all of a temporary character, has been undertaken in more permanent camps. When *A. funestus* was present rapid clearing of breeding places has resulted in a spectacular drop in the numbers of this species found.

The efficiency of control has always been checked by regular weekly adult catches in the most suitable shelters or huts available. These were chosen for their suitability as anopheline resting places and for their strategic position in relation to the main breeding places in order to reveal the probable source of any residual anopheline infestation. Some difficulty is often experienced in preventing the spraying of such chosen catching stations, or it may even be inadvisable to prevent it, and for this reason native huts on the periphery of the control are often the most useful index of anophelism.

But the effectiveness of any control undertaken has never depended on the

application of any one method of attack. When, as is generally the case, the situation that has to be dealt with is an active state of malaria transmission every available method for the reduction of the numbers of *Anopheles*, and the breaking of the chain of infection from man to man, must be brought into operation to the fullest extent possible under the circumstances prevailing. In the presence of truly hyper-endemic malaria (the circumstance under which much of our experience has been gained) we have not always succeeded in reducing malaria incidence to that insignificance which was our aim but we could certainly never have approached that aim without the use of every weapon at our disposal. Larval control, under the conditions of fluidity inseparable from a military existence, requires reinforcement by adult killing; to a still greater extent an anti-adult attack which leaves untouched the anopheline larval reservoir is doomed to failure. This was shown to us very clearly by the experience of South Africans who had become skilled in the use of this method in the epidemic areas of the Union and depended upon it in East Africa. Finally, however good unit anti-malarial discipline may be, if vector *Anopheles* be present in any number malaria rates will be high. In the example of a brigade camp quoted above effective reduction in anopheline population followed within two weeks of the establishment of larval control although reduction to insignificance took much longer to complete. As against this example there may be quoted that of an A.A. battery on the Coast in which a 40 per cent incidence of malaria occurred in one month. In this case, although unit anti-malarial discipline was good, anophelism was high owing to the failure of larval control by a civilian organization.

We are convinced of the importance of larval control as well as other anti-malarial methods under all circumstances. It is because of this conclusion that we are also convinced of the necessity, if malaria rates in hyper-endemic country are to be substantially reduced, for specialist anti-malarial units or detachments to be in the near neighbourhood of all military activity. In effect anti-malarial units should be regarded, in a tropical country, as essential first line units and not only as luxury base units.

SUPPRESSIVE TREATMENT.—Little experience has been gained of the use of suppressive treatment. Individuals who were in the habit of taking a daily dose of quinine in peacetime have not been dissuaded from doing so. For the remainder an estimated malaria rate of 10 per cent per month has been adopted as a very rough criterion for the necessity of imposing suppressive treatment and on only isolated occasions has control by other methods been so ineffective that the necessity has arisen. On a number of other occasions short courses of curative treatment have been given following exceptional exposure to infection.

When suppressive treatment has been given the impression gained has been that only a very partial suppression of attacks was achieved and that, while units receiving it tended to rely on this rather than other methods of control, other units exposed to similar risk achieved a greater freedom from malaria by concentrating on these other methods.

In this connexion the comments made above on malaria rates in Madagascar should be noted.

SUMMARY.

(1) Malarial endemicity in the wide area covered by troops in East Africa is briefly described.

(2) The anti-malarial organization which has been found to meet the needs of the Command is described, emphasis being laid on the essential part which Africans play.

(3) Reference is made to the type of circumstance in which malaria was most likely to be acquired and various records of malaria admissions in particular areas, and for the Command as a whole, are given. The origin of infection of cases in other records is too uncertain to justify quoting them.

(4) In the presence of fully organized anti-malarial measures of one kind or another malaria rates in the most hyper-endemic areas have not exceeded 40 per cent per annum in Europeans.

(5) The measures adopted are described. Emphasis is laid first of all on the essential pre-condition of success, namely, malaria mindedness in all those who are to be saved from infection.

(6) This malaria mindedness finds its primary application in the siting of camps, staging posts and bivouacs. Great assistance in the reduction of malaria is achieved by making the fullest use of the element of choice of site even within limited areas.

(7) Personal protection and adult mosquito killing are always applicable and have been fully used. A small mosquito net is always carried by first line troops.

(8) But malaria rates have remained high, even when suppressive treatment was used, unless these two methods were supplemented by larval control. This method can always be applied over some distance surrounding an occupied area and, even if this distance be small, it is worth while applying to that extent.

(9) The initial stages of larval control must be supplemented by adult killing.

(10) There is no royal road to the control of malaria in war but, by the application of all anti-mosquito measures to the maximum extent possible under the particular circumstances prevailing, it has proved possible to reduce malaria to a level at which it does not cripple the efficiency of units without the use of suppressive treatment.

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COMMON ANORECTAL CONDITIONS IN THE ARMY.

BY MAJOR H. S. SHUCKSMITH, F.R.C.S.

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ANORECTAL lesions represent a relatively large proportion of surgical conditions seen in a Military Hospital working under static conditions.

A considerable number of cases are referred because the simple condition of external hæmorrhoids is not recognized, the universal presence of internal hæmorrhoids of some degree in patients aged 20 to 40 years is not realized and symptomatic measures for the relief of these conditions are not attempted.

There is, however, a relatively high incidence of rectal bleeding and painful anal conditions in a locality where dysentery is endemic.

Anal ulceration and rectal bleeding are so frequently caused by protozoal proctitis that the exclusion of dysenteric ulceration by sigmoidoscopy is essential when examinations of the stools for *Entamoeba histolytica* are negative.

THROMBOSED EXTERNAL HÆMORRHOIDS.

This condition occurs in men between the ages of 20 and 30 and accounts for 30 to 40 per cent of the outpatient attendances for hæmorrhoids; it is the rupture of a thrombosed vein of the external hæmorrhoidal plexus which is situated just distal to Hilton's line (fig. 1). The thrombus is recognized as a

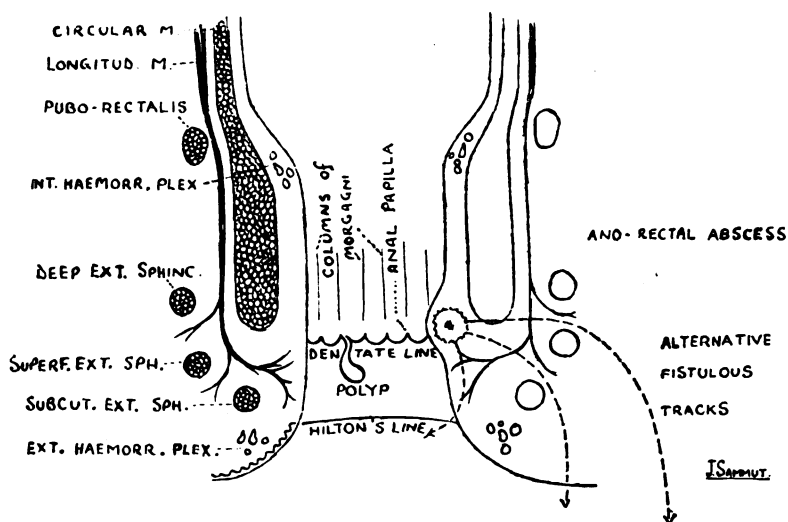


FIG. 1.

bluish swelling the size of a pea, nearly always single, close to but not intruding into the anal margin, which feature distinguishes an external pile from a composite third degree intero-external hæmorrhoid.

Spontaneous organization is the usual sequence, leaving an anal tag, but rupture of the skin leading to profuse bleeding or suppuration may occur.

Discomfort or pain at the site of the swelling, particularly on defæcation, is experienced for three to four days and then gradually disappears but sudden relief from pain will result if the skin over the clot bursts or a more constant throbbing pain will be felt if the lesion becomes inflamed.

Resolution is the rule and washing of the anus after defæcation and the application of a dusting powder, if available, is sufficient. Should, however, the swelling be large, the skin appear very tense, soggy, or inclined to rupture, then the clot ought to be evacuated. 1 to 2 c.c. of local anæsthetic are infiltrated into the base of the swelling and the mound picked up in forceps and cut off flush with the base, the clot then being picked out of its bed. This technique of "saucerization" gives a flat wound without overhanging edges which heals well and requires neither special dressings nor stay in bed. If anal tags be present from the organization of previous thrombi, and operation is performed on a recent thrombus, these tags should be trimmed off as well, otherwise they become œdematous from the supervening mild infection which ensues and this makes a period of hospitalization necessary.

INTERNAL HÆMORRHOIDS.

Neumann studied sections of anal canals in subjects of age groups varying from prenatal life to old age. He found that as age advanced the incidence of hæmorrhoids increased and that they were present in every subject after the age of 20.

An internal hæmorrhoid is a dilatation of the venous and arterial radicles situated at the base of the columns of Morgagni (fig. 1). The main branches of the hæmorrhoidal arteries and veins are found in the right anterior, right posterior and left lateral quadrants and such are the sites of the three primary groups of hæmorrhoids. The morbid anatomy of internal hæmorrhoids can be usefully traced through three stages or degrees for clinical purposes. The initial stage or first degree is represented by a velvety swelling, blue in colour, in which the predominant symptom is bleeding; prolapse does not occur. The second stage is reached when elongation of the pile-bearing area allows prolapse at stool; the mucosa becomes thickened and bleeding is less common. In some cases one group of this second degree hæmorrhoid, which is larger than the other two, may be strangulated by contraction of the anal sphincter after the hæmorrhoid has prolapsed on defæcation. Such a complication may lead to infection and organization and a relatively avascular polypoidal pile be formed. The third stage or degree—well designated intero-external hæmorrhoids—is established by dilatation of the veins communicating between the internal and external hæmorrhoidal plexuses. Chronic congestion results from the failure of the local circulation and produces œdema of the skin and the formation of multiple perianal tags. External hæmorrhoids extend into the anal canal and the internal hæmorrhoids present at the anal orifice without straining. Intero-external hæmorrhoids are frequently strangulated by contraction of the anal sphincter and a large, angry-looking, fleshy mass is seen at the anal orifice; it may be ulcerated or sloughing. When this stage of hæmorrhoids has been present for some years the anal sphincter is relaxed and the prominent symptoms are a moist perinaum and pruritus ani.

Correction of constipation, if present, is the prime essential in the management of all cases of hæmorrhoids. Adequate fluid intake and the use of cascara, which is probably the best laxative now available, are often adequate measures to control the first degree of hæmorrhoids.

Strangulated hæmorrhoids demand reduction of the prolapsed mass through the anal sphincter as it is the spasm of this muscle which is the strangulating agent; reduction can frequently be obtained without anæsthesia. Beyond a fluid diet and rest in bed for a few days no further treatment is necessary until the patient is proctoscoped in two months time. In many cases the hæmorrhoids will thrombose and neither injection nor operation will be necessary.

Injection of a sclerosing solution above the base of the pile-bearing area is efficacious in the control of bleeding in first degree piles and of prolapse on defæcation in second degree piles. Sigmoidoscopy should precede injection therapy in cases with a recent history of diarrhoea or chronic constipation, to exclude the presence of any other rectal source of bleeding which is commonly found in amœbic dysentery, bearing in mind the possibility of carcinoma in patients over 40 years. 4 per cent carbolic in almond oil is used in quantities sufficient to produce pallor of the rectal mucosa dealing with one group at weekly intervals. Complications are extremely rare but it is well to remember that anal œdema and anorectal ulceration may develop if too much of the sclerosing solution be injected at one time or if proctitis, due to amœbic dysentery, is present. In hæmorrhoids which are bleeding profusely, direct injections into the hæmorrhoids of 5 minims of 20 per cent carbolic are effective.

Operative removal of hæmorrhoids is rarely necessary and is reserved almost entirely for the intero-external type of hæmorrhoids. Miles' operation is simple, requires few instruments or material and gives excellent results. The sphincter is dilated and the three groups of piles pulled down. The mucocutaneous junction is seized with a hæmostat and the upper limits of the internal pile with a pair of ring forceps. The group is held with the two forceps and the perianal skin at the periphery of the external hæmorrhoidal component divided with scissors. Dissection is carried down to the subcutaneous anal sphincter and the base of the mass of tissue held in the forceps is ligatured with stout silk; the strangulated masses are not cut off; the other groups are dealt with in turn. Separation occurs in three to four days and leaves an entirely flat base. The patient should be fit for light duty fourteen days after the operation.

ANAL SPASM.

The anal canal is covered with uncornified squamous epithelium and extends from the white line of Hilton below to the dentate line above. The epithelium is upheld by very little connective tissue but is supported by a dense band of fibrous tissue. The main band of the tendon of the longitudinal muscle of the rectum is fixed to this area (fig. 1). The anal canal below the dentate line is supplied by the pudic nerve (sacral 3 and 4) and all lesions of this area cause spasm of the external sphincter muscle and pain on defæcation. Such lesions are *fissure in ano*, anal ulceration associated with amœbic dysentery, anal polyp and anorectal abscess.

FISSURE IN ANO.

This condition is a linear abrasion situated always in the mid-line posteriorly and extending the length of the anal canal. It is produced mechanically by the passage of a scybylous stool tearing the relatively unyielding integument. The abrasion may become infected and the tiny abscesses which form under the skin edge present a pouting bead of tissue overlapping the distal edge of the lesion. This exuberant tissue seen in subacute or chronic states of a fissure is called the sentinel pile of Brodie and is due to inadequate drainage of the outer margin of the fissure. The lateral margin of the abrasion or ulcer always remains distinct.

Many cases of acute *fissure in ano* respond to the correction of constipation and the local application of cocaine ointment. Should this treatment not be effective then digital dilatation of the anal canal is sufficient to allow healing in the acute condition but in the subacute stage when the fissure is a definite ulcer it is better in addition to excise the edges. A chronic fissure requires excision of the indurated base and division of the dense band of fibrous tissue surrounding the anus (pecten band of Stroud) together with the superficial component of the external sphincter (see fig. 1).

ANAL ULCERATION IN AMÆBIC DYSENTERY.

These ulcers which are usually single may be of two types, a small ulcer situated near Hilton's line posteriorly and which therefore must be distinguished from a *fissure in ano* and a larger linear ulcer situated in any quadrant of the anal canal. The base of these ulcers bleeds on manipulation and while, in the small type, the edges are thin and well defined yet, in the large, the edges are oedematous and overhanging.

Sigmoidoscopy is essential in the investigation of these cases and nearly always a granular proctitis or sigmoid ulceration will be found. Repeated examination of the stools for *E. histolytica* in most cases reveals its presence.

Operation on these ulcers leads to considerable morbidity and local anæsthetic ointments are the only permissible therapy during the time the general treatment is being given for the amœbic infection.

ANAL POLYP.

Hypertrophy of an anal papilla forms a polyp which causes anal spasm and

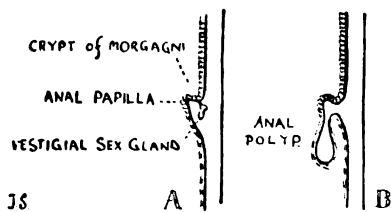


FIG. 2:

prolapses on defæcation (figs. 1 and 2B). Its origin from the region of the dentate line distinguishes it from a polypoidal organized pile. Treatment is removal.

ANORECTAL ABSCESS.

The site of origin of the abscess is almost invariably one of the crypts of Morgagni, probably so determined by infection of the vestigial sex glands, which drain into this region (fig. 2A). The abscess may abort by spontaneous drainage into the rectum but more often it spreads laterally along the lines of cleavage provided by the tendinous terminations of the longitudinal muscle of the rectum (fig. 1). The main portion of this tendon is inserted into the region of the pecten band forming a dense collar of tissue around the anus. Rupture of the abscess into the canal is therefore almost impossible and it presents on the perianal skin finally bursting to form a *fistula in ano*.

It will be recalled that the dentate line which is the level of the crypts marks the upper limit of ordinary pain sensibility. The first clinical evidence of an anorectal abscess is discomfort or pain on defaecation, which precedes, by a day or two, the symptoms and signs of inflammation which are evident as the abscess approaches the perianal skin. In the earliest stages, when the only physical sign is anal spasm, the condition must be distinguished from an acute *fissure in ano* and anal polyp. Later when a perianal swelling is present the differential diagnosis involves perianal boils, infected scabies and a suppurating thrombosed external pile.

Operative treatment for a large anorectal abscess presenting under the skin is best limited to a wide cruciform incision without exploration of the track but, when the abscess is small and the track passes superficial to the external sphincter, it is better to prolong the appropriate line of the cruciform incision and so lay open the whole area from the infected crypt into the anal canal. When there is no external redness of the skin, external drainage to the perianal skin must nevertheless be provided for simple incision of the abscess into the anorectal canal does not give adequate drainage and the anorectal wall remains chronically indurated.



FISTULA IN ANO.

The external opening of a fistula is most commonly within $1\frac{1}{2}$ inches of the anal margin while the internal opening is in some quadrant of the dentate line as an anorectal abscess developing from cryptitis is the precursor of fistula. The connecting track between the two openings runs deep to various parts of the external sphincter following the track of the tendinous termination of the longitudinal muscle of the rectum (fig. 1). Goodsall's law gives some idea of the site of the internal opening in the canal when the external orifice is situated at a distance of 1 to $1\frac{1}{2}$ inches from the anal margin. Briefly, the law states that if a line be drawn in the coronal plane across the mid-point of the anus, then in cases where the external orifice is in front of this line the internal orifice is radially opposite, but when the external orifice is behind this imaginary line the internal opening is in the mid-line posteriorly. The causative crypt can be identified at operation by careful inspection, palpation, probing with a blunt hook and traction on the track.

In view of the cryptogenic origin of the fistula it is interesting to speculate on the reason for its running superficial to the external sphincter in some cases,

deep to the subcutaneous or superficial components in others. Fansler gives an explanation which appears eminently reasonable. It is noticed on digital examination that in many cases there is a distinct separation between the external and the internal components of the sphincter and also that the length of the anal canal varies. The dentate line, which marks the upper limit of the anal canal, bears a different relationship to the components of the sphincter in different individuals. This is shown diagrammatically in figs. 3A and 3B. When the dentate line is distally placed in the anorectal canal then an abscess arising in a crypt and extending laterally ruptures through the skin passing entirely superficial to the sphincter or deep merely to the superficial component (fig. 3A). On the other hand, a proximate dentate line will result in a fistula running deep to the whole external sphincter or through portions of the internal sphincter and pubo rectalis (fig. 3B).

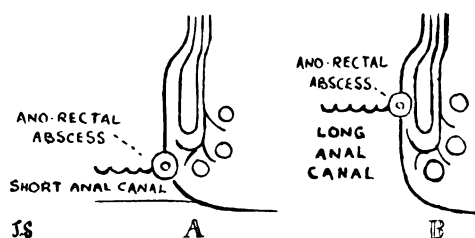


FIG. 3.

Fistulae which have an external opening more than $1\frac{1}{2}$ inches from the anal margin often pass through the levator ani. Multiple fistulae and horseshoe formations occur.

It is essential to remember the high incidence of pulmonary tuberculosis in patients with fistula and also the tuberculous nature of many fistulae, which can only be shown on histology. In some cases the fistula may show typical features of tuberculous ulceration, single or multiple openings with bluish undermined edges, but more often there is no characteristic appearance.

Treatment of a fistula which passes superficially through a part of or deep to the whole external sphincter is relatively simple, provided the whole track, which should be identified by its different appearance from the surrounding tissue rather than by injection of methylene blue, be laid open, the edges excised and a flat wound with a broad base be produced. It is not necessary actually to excise the internal opening. The whole of the external sphincter can be divided with impunity. Division of any part of the internal sphincter or pubo rectalis, which would be necessary to lay open a fistula passing through the levator ani, is liable to the complication of incontinence, whether the operation is carried out in one or two stages. Such a fistula may respond to the injection of 10 per cent carbolic along its track but, should this not lead to healing, partial excision of the fistula should be performed and complete rest to the part established by means of a temporary colostomy. Such a procedure is much better tolerated by a patient than incontinence subsequent to a radical operation.

PROCTITIS IN AMÆBIC DYSENTERY.

The clinical manifestations of amœbic dysentery may be most variable. Two chief types are encountered, one commencing with griping pains and diarrhœa and the other less acute in its onset with slight abdominal discomfort, distension and looseness of the bowels after meals. Constipation is a common sequel in both these types and in some patients it is the only general feature in the history when sigmoidoscopy demonstrates proctitis as the source of rectal bleeding. The efficiency with which sigmoidoscopy is carried out depends mainly on adequate preparation of the bowels. The following is an effective method of preparation: first day, castor oil—2 ounces; second day, fluid diet and pil. opii gr. iii at night; third day, a simple enema.

The operation is much more comfortable for the patient if caudal anæsthesia be used and the examination is carried out with the patient lying on his left side. Passage of the instrument to its full length is facilitated if, under direct vision, it is pushed rapidly along the sinuous curves to the limit of the instrument and the detailed examination of the mucosa is made during a slow withdrawal.

The mucosa varies enormously in its degree of redness and, unless bleeding points are seen, which is facilitated by air distension, little reliance can be placed on its interpretation. An abundant turgid mucosa is pathological and should it be granular an inflammatory condition is definitely present. The term "granular proctitis" has never had much ætiological significance but should be considered merely as a sign that painstaking search must be made for the dysentery bacillus and the *E. histolytica*.

Small ulcers, seen in the cases in which *E. histolytica* had been isolated, were sited maximally in the bowel 7 to 10 inches from the anal orifice. The ulcers vary from a small pin-head size bleeding point to an ulcer the size of a wheat grain with a well-defined, yellow basal sphacelus, with its long axis transversely placed and little surrounding congestion of the mucous membrane. Occasionally two small ulcers were seen joined together by a bridge of mucous membrane.

In many cases referred for bleeding piles and some referred for anal spasm bleeding points in the rectum have been found on sigmoidoscopy which has led to the identification of the *E. histolytica* as the causal agent by repeated examinations of the warm stool.

CONDYLOMATA.

Syphilitic lesions are uncommon but do exist; any patch of moist sodden skin around the anus demands serological investigation. A recent case showed a thrombosed external pile perched on a patch of sodden skin; the Kahn reaction was positive.

Condylomata acuminata are frequent. They appear as multiple seedlings confined usually to the perianal skin but in one case they extended the whole length of the anal canal; occasionally they may be large and appear like a cornified cockscomb. Penile condylomata are often present and these, more often than not, are associated with a gonococcal urethritis which has stopped discharging about ten to fourteen days before the warts appear. Small condylomata disappear

after the application of glacial acetic acid, the surrounding skin being protected with vaseline, but this treatment takes considerable time. Removal with a curette or snipping off the warts at the junction with normal skin and the application of pure carbolic to the base does not lead to seedling growth and is expeditious.

PRURITUS ANI.

The incidence is notably low. Most of the cases have an advanced flexural dermatitis which is particularly noticeable amongst the Maltese troops. A few

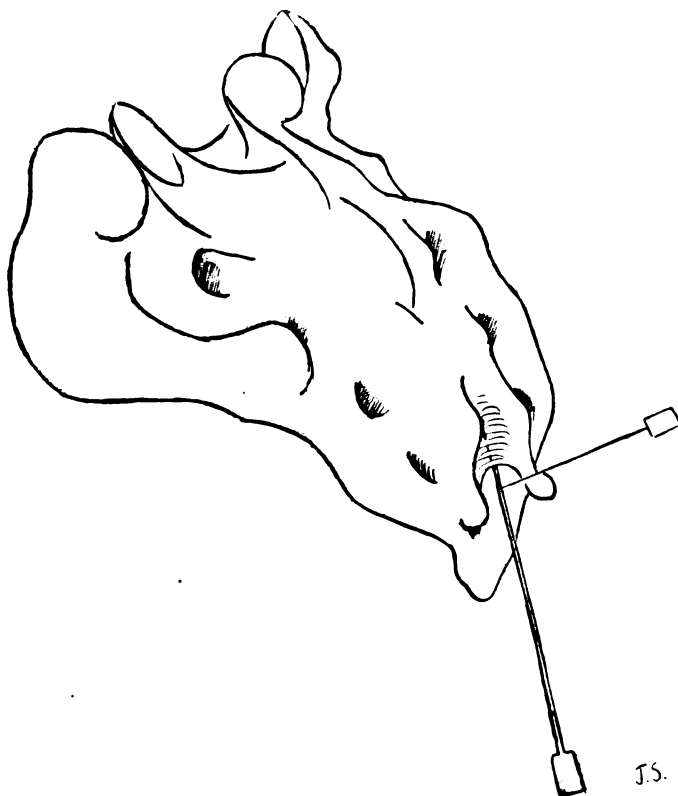


FIG. 4.

present local anorectal lesions but others have no abnormal local or general physical signs.

Toilet with water and wool followed by the application of calamine lotion containing 1 per cent carbolic is helpful. Flexural dermatitis responds well to the local application of 1 per cent silver nitrate alternating either with 1 per cent gentian violet or $\frac{1}{2}$ per cent brilliant green in aqueous solution. Suitable treatment should be adopted for any specific anorectal lesion. If, in spite of local applications and in the absence of abnormal local physical signs, the condition remains unchanged a course of injections as for clinical hæmorrhoids sometimes provides relief. The rationale for this therapy is based on a suggestion made that, as

the symptom of itching is always present where there is œdema of the skin, pruritus ani may be caused by a subclinical œdema of the anal skin produced by a failure in the venous circulation of the hæmorrhoidal plexuses. The introduction of sclerosing solutions above the pile-bearing area is followed frequently by symptomatic improvement.

ANÆSTHESIA.

Caudal anæsthesia was almost invariably used in investigation of cases of anal spasms, in operative measures for fissure, hæmorrhoids, anorectal abscess and fistula and for sigmoidoscopy.

30 c.c. of 2 per cent Novutox are introduced into the sacral canal through the fibrous tissue diaphragm which covers the bony deficiency between the palpable sacral cornua.

Anæsthesia is produced in twenty minutes and a sign of its effectiveness is the production of slight turgidity of the penis.

Fig. 4 shows the anatomical details of this method of sacral nerve block.

SUMMARY.

(1) External and internal piles are described. Spontaneous resolution in the former and the universal presence of the latter in subjects aged 20 to 40 are noted. It is essential that the hæmorrhoids be established as the cause of symptoms before sclerosing therapy is adopted. The indications for operative removal are given and it is pointed out that such is seldom necessary.

(2) The lesions which cause anorectal spasm are described. The importance of recognizing anal ulceration in association with protozoal proctitis is stressed.

(3) Sigmoidoscopic examination is considered essential as a pre-operative measure in many cases of anal ulceration and rectal bleeding as operative treatment of local lesions in the presence of rectal or sigmoid ulcers leads to considerable morbidity.

(4) The anal consciousness of the soldier allows anorectal abscess to be seen at its earliest stages ; its pathology together with that of *fistula in ano* is described.

(5) The frequent association of condylomata acuminata with gonococcal urethritis is confirmed.

(6) The incidence of pruritus ani is notably low.

(7) The value of caudal anæsthesia in anorectal manœuvres cannot be over stressed. The method is described.

I am indebted to Surgeon Captain J. Sammut, R.M.A., for his great care with the diagrams and to Colonel F. Whalley, D.S.O., T.D., K.H.P., for permission to submit this article for publication.

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THE MANAGEMENT OF LUNG DISEASE OF UNCERTAIN DIAGNOSIS.

BY LIEUTENANT TERENCE LEE, M.R.C.P., M.B., B.S.,
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DETECTION of lung lesions by radiology has enabled us to make substantial advances in the management and treatment of respiratory diseases. But, as a result, new problems have arisen. Not least among them is the confusing of other lung diseases with tuberculosis. The differential diagnosis is important in the armed forces as a tuberculous patient, while he remains on duty, gravely endangers both his own life and the health of his comrades. Therefore the medical officer must suspect tuberculosis in every case presenting an abnormal lung shadow where the ætiology is not known. He must remember that to return a soldier with a small quiescent tuberculous patch to arduous duty may precipitate a rapid and disastrous extension of the disease. On the other hand the well-ordered life in an Army convalescent hospital gives the suitable non-tuberculous lung lesion the best opportunity for healing. Furthermore, unlike many other chronic illnesses, a mistaken notification of lung tuberculosis, quite easily made by a too hasty decision on a single X-ray film, will deprive the armed forces of a valuable man. He will be placed on the civilian tuberculous register and, for a lengthy period, will be made incapable of work and a burden on the war effort. He will also come into contact with open cases of tuberculosis.

The problem arises either after an acute febrile illness or as a result of investigations into the cause of chronic ill-health. The radiological report indicates the presence of lung shadows which may be tuberculous; yet the sputum tests are negative. A brief mention only can be made here of other possible causes. They include small areas of unresolved pneumonia, interstitial pneumonia, localized lung collapse after low-grade bronchopneumonia, patchy peribronchial fibrosis with early bronchiectasis, intrathoracic neoplasms and actinomycosis. Since chemotherapy has become so widely used in treating pneumonia, and even obscure pyrexial attacks, small areas of delayed resolution appear to occur more frequently. It is probable that an acute attack is aborted yet a partly developed pneumonic patch remains in the lung field. Finally congenital cystic disease, healing lung abscess and hydatid disease with secondary infection are often confused with fibro-cavernous tuberculosis.

Before further action, the medical officer is advised to review the family history, the complete personal record and the clinical condition of the patient. He should try to be present when a medical specialist is called in for a second opinion and both should view the X-ray film in consultation with the radiologist. This interview will prove most helpful since the radiologist will be able to demonstrate the exact position, definition and extent of the lesion and indicate any limitations in an X-ray film taken with field equip-

ment. The clinicians' interest will stimulate team work and, where the syndrome seems to indicate it, further radiological investigation will be suggested by the radiologist. A bronchogram may be helpful but the residual lipiodol will continue to obscure the affected lung fields for long afterwards. Unless the evidence is strongly suggestive of bronchiectasis, diagnostic lipiodol should not be injected until another X-ray, taken a month later, is available for comparison with the original film. Apical disease suggests tuberculosis but, in the writer's opinion, only the well-defined cotton-wool patches justify the diagnosis solely on radiological evidence. Even then it may be advisable to treat as tuberculosis and wait for the second X-ray before making a final decision. Lesions in the lower zones are probably non-tuberculous but there are many exceptions to this rule. Consequently the differential diagnosis may be very difficult but a satisfactory decision can usually be made after some time. During this period the medical officer can observe the patient's progress, his tolerance to graduated exercise and his response to such treatment as may seem indicated. In addition he will be able to carry out further bacteriological examinations and to observe changes in the lung fields by X-ray films taken in series.

Progress is assessed by watching the four-hourly temperature chart, the pulse-rate, weight and blood sedimentation rate. At this stage, despite his gradually increased activity, an initially abnormal sedimentation rate should show a steady improvement week by week. A further search should be made for tubercle bacilli in concentrated specimens of sputum. Where necessary, this can be supplemented by stomach washings, cultural methods and even animal inoculations. Suppurating hydatid lung cysts may resemble active tuberculosis. If the patient has been serving in an affected country, such as Iceland, the pathologist should be warned to look for cyst wall and scolices in the sputum. In addition, Casoni's intradermal test should be done as a routine investigation in such cases.

Treatment is aimed at building up general resistance, re-expanding any areas of collapsed lung and eradicating any local infection. The patient is placed on a diet of extra milk and vitaminized oil therapy. In northern climates, providing that exudative phthisis can be excluded, ultraviolet light will benefit by its general stimulating effects. Modern vaccine therapy is often valuable. Where an autogenous vaccine is not practical the initial dose of a proprietary mixed vaccine should be small; at least one-tenth of the maximum dose. Providing that there is no sharp reaction this dose may be increased each five to seven days by a tenth until a course of ten injections has been given. Simple breathing exercises will promote aeration of collapsed lung or, later in convalescence, special exercises may be indicated either to correct faulty chest expansion or to teach diaphragmatic breathing where bronchial spasm impedes expiration. If bronchiectasis is suspected the patient should have postural drainage together with an expectorant mixture. Finally the upper respiratory tract should be examined by a specialist and any sepsis energetically treated.

ally amongst men whose work brings them into contact with any of the animals mentioned above.

SUMMARY.

The case described in this article brings out the following points:—

- (1) The flare up of the wound after an interval of a fortnight with general constitutional symptoms.
- (2) The characteristic local signs with no suppuration.
- (3) The recovery of the *streptobacillus moniliformis*.
- (4) The response to treatment with sulphanilamide with no relapse of the fever.

I should like to thank my Commanding Officer, Colonel F. C. Chandler, M.C., for his permission to forward this case for publication, also Lieutenant-Colonel E. G. H. Cowen, R.A.M.C., and Major J. Boycott, R.A.M.C., for their help with this article. Major Boycott also carried out the bacteriological examinations.

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DIAPHRAGMATIC DYSPNŒA.

BY LIEUTENANT G. H. DAY, M.A., M.D.CAMB.,
Royal Army Medical Corps.

THE commonest disorder of the respiratory system in the British Army would appear to be dyspnœa due to faulty diaphragmatic function. Such was the writer's experience when examining batches of soldiers referred to the Norfolk and Norwich Hospital on account of respiratory distress discovered during their training.

History.—This condition manifests itself comparatively late in a man's training. He can march with full equipment at a "reasonable" pace indefinitely, he can stand up to P.T. and he can play some games; but when he reaches a certain point in intensive training and has to run over "assault courses" he becomes a hopelessly dyspnœic. In his own words he "gets whacked" by exertion which his fellows can encompass with little distress. No amount of perseverance or determination on his part will improve his "wind."

Past History.—Will reveal nothing suggestive of organic disease.

Physical Signs.—On ordinary routine clinical examination, these are not suggestive of anything except "chronic emphysema," by which name the condition is most frequently labelled. The respiratory excursion of the thoracic cage is generally excellent but there is diminution of breath sounds at both bases. Careful percussion during respiration will reveal absence of shifting dulness over the costo-phrenic margins and inspection and

measurement of the abdominal girth will reveal little or no expansion at full inspiration.

X-ray Photography.—Generally reveals perfectly normal-looking lungs.

Fluoroscopic Examination.—Is the only procedure by which diagnosis can be established or confirmed. The excursion of the diaphragm during the respiratory cycle will be found to be slight, absent, or even paradoxical.

Differential Diagnosis.—Of the cases examined the various clinical diagnoses were: "Chronic emphysema (with or without bronchitis)." "Right-sided heart failure." "Pulmonary Tuberculosis." All of which complaints, be it noted, bring about down-grading, if not discharge, in the Army; whereas functional inaction of the diaphragm should be curable.

Suggested Treatment.—Diaphragmatic breathing exercises controlled by fluoroscopic examination and spirometry.

By holding a mirror in front of the fluoroscopic screen at such an angle that the men could watch their diaphragmatic movements I was able to inaugurate considerable improvement in the two or three cases in which I had leisure enough to attempt re-education.

The importance of the recognition and treatment of this condition is sufficiently obvious to require no emphasis.

AN IMPROVISED HOT AND COLD SPRAY BATH FOR USE IN THE FIELD.

BY MAJOR H. H. CLAY,

Royal Army Medical Corps.

FEW things are of greater value to troops in the field than adequate facilities for getting a bath and there can be little doubt that, from every point of view, the most practical and at the same time the most agreeable provision that can be made is some form of spray bath, preferably with hot as well as cold water supply. That the need for some such provision is real is evidenced by the many efforts made by units on active service to meet it.

In the nature of things many of the apparatus produced are neither easy to make nor economical to run: many of them cannot properly be classed as improvisations and are possible only to units possessing skilled mechanical personnel and well-equipped workshops. This is especially the case when attempts are made to provide hot as well as cold water baths.

A spray bath apparatus capable of meeting the needs of any large unit is necessarily complex and to some extent cumbersome but, for small units, of which in modern conditions there are so many, it is definitely possible, without going beyond the bounds of improvisation, to make and set up an apparatus which is at once simple and efficient, and even mobile.

Before discharge to a convalescent hospital the patient should be up all day and able to take frequent walks in the hospital grounds. The evening temperature and pulse chart should be normal, lost weight should be regained and the sedimentation rate should be normal or approaching that figure. The final X-ray in some cases will show satisfactory anatomical improvement while, in others, it will be possible for the radiologist to state that the lesion is fibrotic. In a few cases, despite all investigations, the possibility of low-grade quiescent tuberculosis cannot be excluded. Providing that the clinical condition is satisfactory the patient can go to a convalescent hospital but will require more careful management as indicated below.

The majority may need temporary lowering of their category to B₁. Where the diagnosis is still doubtful or progress retarded, or where symptomatic disability requires it, the patient should be graded category C. After discharge from a convalescent hospital to a unit patients still suspected of tuberculous infection should be instructed to return to the "medical out-patients" for radiological and laboratory examinations at an interval of two to six months depending on the merits of the individual case. In addition such cases should be placed on the unit medical officer's list as set out in the Army Medical Services Regulations, 1938 (Medical Inspection of Troops, para. 180, sub-para. C.). This states that "Every soldier who has suffered from an illness which may be regarded as the possible precursor of tuberculosis, such as pleurisy or hæmoptysis, will, after discharge from hospital, be weighed and carefully examined as to his general condition once a month, special regard being paid to the condition of his chest. The officer in medical charge of effective troops will maintain a list of such cases and arrange with the O.C. unit for the man to report monthly for examination." Small areas of fibrosis will not deter a man from military service in a lowered category. Where consolidation persists or is replaced by extensive fibrosis, and the patient has marked dyspnoea or severe recurrent bronchitis, he should be boarded out of the Army as such and be given suitable civilian employment. It is important in all cases to record a careful summary of the clinical condition and investigations on the B178A form. Such a record, which includes details of the radiological and laboratory findings, will prove valuable should the patient relapse and be admitted to another hospital.

SUMMARY.

The danger of notification of pulmonary tuberculosis on doubtful radiological evidence has been stressed. The other possible causes of abnormal lung shadows have been noted and a scheme for the management of lung diseases of uncertain diagnosis has been outlined. Briefly, such a scheme includes a period of careful hospital observation combined with investigations and the taking of a second or more X-rays at suitable intervals for comparison in series. Finally standards for regrading and disposal have been suggested.

Editorial.

OPSONINS IN THE PHAGOCYTOSIS OF BACTERIA.

IN these days but little thought is given to the phenomenon of immunity in the treatment of bacterial infections. We do, indeed, depend, for the *prevention* of diseases of a certain type, on the prophylactic use of vaccines; typhoid and the paratyphoids, cholera, plague and a few others; but, for the *treatment* of bacterial infections by the more common and less preventable organisms, streptococci, staphylococci, gonococci and meningococci, we rely on a number of new chemical substances, the sulphonamides, penicillin, etc., to save the subject *after* his tissues have been invaded. Although we know from the observations of Fleming and others that the sulphonamides work best in those who have been endowed with a certain amount of immunity, still the average doctor treats the average patient without taking into account his immunity or, for that matter, the kind of germ with which he may be infected, and nobody quarrels with the doctor for taking a chance, in a manner that may well be considered unsound, with remedies which, in fact, prove to be efficient in nine cases out of ten! This is the age of the chemist as opposed to the immunologist. Men and their bacterial invaders live or die according to slight modifications in a hexagonal ring. And yet there is a large element of immunity behind all this direct chemistry; immunity which is itself a chemical problem though it was first investigated not by chemists but bacteriologists. And, in this province, the Army and its pathological specialists have played a distinguished part. It is well worth our while, at such a moment as this, to turn back the pages of history to the days of forty or fifty years ago when Wright—now Sir Almroth—was our Professor of Pathology at the Army Medical School at Netley and Leishman had just returned as a Captain from India to work as one of his assistants. These two, more perhaps than others in England, had the study of immunity in mind and experiments about it in hand. From their work or rather, at first, from Wright's alone, flowed the earliest facts about anti-typhoid vaccine and other immunity-producing substances which are still our most potent prophylactics in the protection of Armies in the Field. It was their observations which led on to so much effort and so many controversies in the domain of the phagocytosis of bacteria—then regarded as the study most likely to lead to great results. Let us recall for a moment the investigations of Leishman in 1901 and 1902 on the "Phagocytic Index" (*British Medical Journal*, January 11, 1902) and of Wright in the development of it which led to the discovery of opsonins (the *Proceedings* of the Royal Society, 72, 1903). Leishman describes his earlier observations as follows: "In my first series—my original technique—one volume of

blood of the observer was drawn into a capillary pipette and at once mixed with an equal volume of a suspension of an agar culture of the germs to be treated, prepared with normal saline solution. A second tube was prepared, containing the patient's blood, in exactly the same way. From each of the tubes thus prepared a drop was placed on a slide, covered with a cover slip and introduced into a moist chamber at 37° C. for 15 minutes. At the end of 15 minutes the cover glasses were slid off the slides and the blood film left behind was dried and stained by my modification of Romanowsky's method." The bacteria in 100 leucocytes were counted and the counts from the patient and the observer compared. Wright saw the possibilities of this method and gave close consideration to it. Was the germ or the leucocyte affected by the blood? Was it, to quote Bernard Shaw, who afterwards wrote a great play on the subject, a question of "buttering the bacteria" or of "stimulating the phagocytes"? With the assistance of Captain Douglas, I.M.S.—for about now Wright had left Netley and was working at St. Mary's Hospital—Wright was able to settle the matter, at least for the time being. "Douglas and I," he says, "showed in our original paper on the opsonic power of the serum that the phagocytosis which occurred when washed corpuscles, microbes and serum were brought together was due to the serum acting upon the microbes in such a way as to prepare them for ingestion." And so the Opsonic Index was discovered and the many investigations into it started. It seemed to reconcile the "humoral theory" of the German workers with the "cellular theory" of Metchnikoff by giving equal importance to both. Alas, the story did not remain altogether firm. The efforts of many and distinguished bacteriologists led to much difference of opinion and, in many respects, only darkened the field. The hard and bitter work involved in opsonic observations proved too much for any except a select few. Wright himself, with singular honesty, wrote, in 1942, in his wonderful paper, "On the Need for Abandoning Much in Immunology that has been Regarded as Assured," that he had abandoned the idea that the bacteria only were influenced by the serum and that he was now satisfied that the leucocytes also were affected by "stimulins" as had been previously postulated by Metchnikoff. Many side-tracks had been started by many observers. The question of "incitor substances," which might survive in the serum after heating to 60° C., had been raised and cannot yet be regarded as finally settled but this is, after all, a separate question. The natural result had followed long before Wright's final paper appeared. The Opsonic Index as a guide to immunity had been, to a great extent, dropped by the medical profession. *And yet there is much in it.* We wonder whether this promising though difficult field will ever be thoroughly and finally explored.

Clinical and other Notes.

MINOR PSYCHOLOGICAL DISTURBANCES IN THE SERVICES.

BY CAPTAIN IAN DOUGLAS-WILSON, M.D., M.R.C.P.ED.

Royal Army Medical Corps.

THE common occurrence of minor psychological disorders is well known to the civilian practitioner. No criterion is available for comparison but there is reason to believe that such cases are observed even more often in the Services than in civilian practice. The Service patient, in the main, shows an increased readiness to seek medical advice; he is, moreover, subjected to enforced medical supervision. Secondly, two environmental factors tend to convert potential into clinical psychoneurotics: these are separation from families and the demand for adaptation to a new way of life.

This paper is written by one who claims no specialist knowledge of psychiatry. Its purposes are to indicate the type and frequency of these cases in the Service and to suggest that selected cases may benefit by treatment from unit medical officers. The report is based on experience of 200 cases recently sent to the out-patients' department of a static general hospital for a medical specialist's opinion. Of this number no fewer than 66, or 33 per cent, were found to have psychiatric disabilities accounting for the symptoms with which they had reported sick. Of these cases one was a schizophrenic, one a recurrent depressive, four were frank hysterics and the remainder suffered from anxiety states or anxiety states with features of hysteria. This communication is concerned only with the 60 cases in the last group.

Presenting Symptoms.—Nearly every case was referred for the investigation of organic disease. All cases had somatic manifestations as presenting symptoms except two who reported that their nervous condition was troubling them. The symptoms most frequently presented were headache, dyspnoea, precordial pain, palpitation, dyspepsia, cough, frequency of micturition, hyperidrosis, "rheumatism" and "blackouts." Association of two or more symptoms was common.

Headache to most of these subjects is not so much a pain as a heavy ache or a sense of numbness, tightness or oppression. It is continuous, lasting a week or a month at a time, unremitting and little affected by extraneous factors. Others state that the headache comes on with waking in the mornings and passes off about midday. Aspirin provides at best partial and transient relief.

True functional dyspepsia is difficult to identify with certainty. In some

cases the history is compatible with peptic ulceration but in others a history such as this is given: The patient, who may be of any age, complains of vague diffuse pain the site of which is indicated by sweeping the hand across the upper abdomen. This often dates from youth, is unremitting and progressive only since entry to the Service. It is constant throughout the day but does not interrupt sleep; it is aggravated by eating and partially relieved by alkalis. Flatulence is a prominent symptom and, frequently, a history of vomiting after all meals is given. The bowels are often constipated. A family history of gastric disorders is forthcoming more often than not. On examination no recent loss of weight is found. There is diffuse upper abdominal tenderness without special localization. Aerophagy may be noted and, in hospital, vomitus is found to consist of a mouthful or two of fluid regurgitated soon after meals. Appetite, despite denial, is passably good.

Acute anxiety attacks vary from "a feeling of shaking all over" to "blackouts." Attacks simulating *granda mal* commonly occur and are really expressions of conversion hysteria; but their occurrence in association with anxiety states is so common that they have to be considered with this group. Onset in relation to worry and prolonged or unusual prodromal symptoms may provide some indication of the true condition. The length of the attacks and the subsequent emotional state are unreliable guides because true *grand mal* is frequently prolonged and followed by hysterical symptoms. The epileptic approaches the discussion of his attacks with characteristic objectivity while the reverse applies to the anxious patient. Even with a witness's account it may be impossible to reach a decision, which is then deferred till an attack is observed personally.

Neurotic Stigmata.—Much help in assessing these cases is to be had from a personal history that includes standard of education, civilian work record, employment in, and adaptation to, Army life, consumption of cigarettes and alcohol, conditions of home life and symptoms of neurosis or instability.

Enquiry about the school standard helps to identify the dull and backward. Under Service conditions it is especially important to establish the existence of illiteracy. Illiterates are usually painfully aware of their backwardness in training and are depressed about their incapacity to maintain contact with their families, being reluctant to invoke the help of others for this purpose.

Civilian work records provide a variable indicator. Some reveal their instability by admitting to having changed jobs six or eight times without adequate reason while other unstable subjects give histories of continuous employment in one job from the time of leaving school.

Histories of underlying neurotic stigmata were obtained in all cases of the present series except two who had hysterical reactions to previous organic illnesses. Amongst the common indications of neurosis and instability are: headache, sleeplessness, bedwetting beyond the years of child-

hood, inability to concentrate and/or poor memory, depression or unaccountable mood swings, worrying about trifles and nervousness of darkness or noises.

Frequent concomitant symptoms are : Palpitation, lack of self-confidence, night blindness, fear of driving in cars, emotional lability, sweating, tremulousness under strain, frequency of micturition, dizziness, inability to wear a steel helmet, loss of interest in work or hobbies and disinclination for company.

Difficulty in mental concentration is usually ascribed to the mind 'wandering or to "many thoughts crowding out the thing that I am trying to think of." Depression and swings of mood are admitted in these terms : "I seem to be up in the air one moment and in the depths of depression for no reason the next." Relatives' observation on temperament are valuable : "My wife has scolded me for being so moody." Confession to worrying about trifles is typically associated with good insight : "I know that it's silly but I just can't help worrying about little things."

The importance of a carefully taken family history can hardly be over-emphasized. In more than half the cases a history of psychiatric disabilities in close relations is obtainable. The patient is not always explicit : "My aunt has always been nervous" may be followed, on further questioning, by the revelation that she has spent the last twenty years in a hospital for mental diseases.

Precipitating Factors.—The psychogenesis of these conditions is important both for the establishment of diagnosis and for treatment. In some cases no precipitating factor can be elicited while in others it can be clearly defined. The factor can commonly be established in patients with somatic symptoms in a system previously the site of organic disease. Examples are headaches following trivial head injuries, where insanity or serious damage to the brain may be feared, and cough or breathlessness in the patient who has had bronchitis and who fears tuberculosis. Fears of organic disease also arise without previous involvement of the parts concerned but here a suggesting influence, such as family history of the disease, can usually be discovered.

Other precipitating factors that have been encountered in this series are family worries; concern about money or business; experiences in concentration camps; prolonged training associated with the desire to serve overseas and concern about responsibilities of an N.C.O. Separation from families has a particularly marked effect on some dull and backward patients who miss the advice of their wives to whom they have always previously turned for a decision when in doubt or difficulty.

Less frequent factors, usually discovered after repeated interviews when the writer was a unit medical officer, were fear of insanity; fear of discovery of bedwetting by companions; doubt, usually based on circumstantial rumours, about fidelity of wives; fear of consequences of long-past sexual adventures; fear of breaking down on active service; and self-conscious-

ness about homosexual habits. A limited experience of the last group suggests that they are unsuited to Service conditions, community life tending to increase awareness of the aberration. Rather unexpectedly, only one case of the so-called "compensation neurosis" was clearly established in the series and this dated from civilian employment. It seems probable, however, that many of the neurotic states arising after illness or accident in the Service may be partly determined by the conviction that compensation should be paid by the Government.

Where specific factors cannot be elicited, onset and exacerbation of symptoms may, nevertheless, be proved to have been related to periods of mental stress.

Treatment.—The submission is made that cases of mild anxiety state should be treated by the unit medical officer rather than by the specialist at hospital. The unit officer has the advantage of being able to assess the condition and progress of the patient by repeated personal observation and by enlisting the co-operation of officers and N.C.O.s. If the patient is admitted to hospital he must re-adapt himself to the environment of the Service on his return, while treatment can be undertaken in the unit without ever detaching the patient from that environment. Even a visit as an out-patient to a hospital tends to confirm the belief of the impressionable that theirs is an unusual or serious condition, whereas treatment in the unit is accepted by most as a matter of course. The exception to this principle is the man who is convinced that he has some specific condition which can be denied by the impressive investigations that can be made in hospitals: a negative barium meal result may have a valuable therapeutic effect on the patient who is determined that he has a peptic ulcer.

The method adopted by the writer as unit medical officer was to take a complete history and to examine the patient fully in every system. No further examination is then necessary in the absence of new symptoms; nor is it advisable, as re-examination tends to renew doubts in the patient's mind about his condition and leads him to question the efficiency of his doctor who has reassured him categorically after the initial negative examination. Where doubt exists the patient is referred to the appropriate specialist before reassurance is undertaken. The only types referred initially to the psychiatrist are the grossly dull and backward and those neurotics whose condition is so well established that general treatment is unlikely to prove effective.

Some cases, especially those with fears of organic disease, require no further treatment after one interview. In such cases a detailed examination greatly enhances the value of the subsequent reassurance by creating in the patient's mind confidence that his condition has been carefully considered. Other cases need to be seen more than once. It helps these patients simply to know that the advice of the medical officer is always available to them.

The consultations are best undertaken alone with the patient and not during the morning sick parade. A willingness to listen while the patient

talks freely, sympathy and a tone of firm reassurance are called for. Repeated talks of this sort not only increase the patient's confidence in his doctor and therefore in the reassurance that is conveyed in them: they also bring to light troubles of which the patient has hesitated to speak at the first interview. This, of course, makes further treatment easier, adequate psychotherapy depending, as it does, on a full understanding of the mechanism by which the symptoms are produced.

Insight and improvement can be obtained in some cases where neurotic symptoms are prominent by indicating the relationship of their onset and aggravation to worry. It can be pointed out that reactions to stress differ: involuntary micturition in association with fear and headache with worry can be quoted as examples. This demonstrates the non-organic nature of the symptoms while implying that they are real to the patient. The condition is often aggravated by the suggestion from laymen that the patient is malingering and no opportunity to correct his misconception should be missed.

A number of cases, especially those whose condition is largely hysterical, do not respond and their resentful comment remains: "Something must be causing all this." A much firmer tone is adopted where hysterical symptoms are evident; but this is not always successful and these and other failures are sent to the psychiatrist.

Differential Diagnosis.—The first step in dealing with minor psychological disorders is the exclusion of organic disease or, if this is present, the assessment of its influence on the patient's condition. With the diagnosis established it has to be borne in mind that the neurotic is no less liable than anyone else to intercurrent organic disease.

A most difficult group is constituted by those cases of anxiety state who wilfully exaggerate their disability. These are forwarded to the psychiatrist, wherever possible, with an account of observed performance in relation to symptoms.

In the diagnosis of these disabilities a constant watch must be kept for the rare malingerer. He selects a psychiatric disability because he thinks that no physical sign is necessary for the corroboration of his story. The differentiation of hysteria and malingering is regarded as a matter for the psychiatric specialist. But where neurotic symptoms are presented some guidance may be had from the patient's way of telling his story, his attitude and his behaviour. Few cases of neurosis volunteer the relevant symptoms which have to be obtained by questioning. Recently, a case was seen who related in fine detail, and without prompting, a classical story of compulsive obsessive neurosis. He was despatched to the psychiatrist labelled with this diagnosis. The specialist, however, noted this unusual facility of speech and sent the patient to a special centre for observation. The neurotic is usually tense, anxious, tremulous, emotionally labile, taciturn or irrelevantly talkative, often sweating during examination. He sits erect in his chair, never relaxing. The malingerer, on the other hand, sits back and relates

his story with relish as if in the knowledge of a lesson well learned. Observation of behaviour is open only to unit medical officers and to officers with charge of in-patients. For this reason a report of observed performance sent to the psychiatrist may be of great value in reaching a diagnosis. The difficulty of maintaining a pose over a long period usually defeats the ends of the malingerer. Moreover he can seldom keep his secret. As the charge, if proved, is serious, it is reasonable to impart suspicions to the man's officer, who may furnish information that leads to a definite diagnosis.

I wish to express my thanks to Colonel M. J. Williamson, *M.C.*, for allowing me to report on cases seen in the hospital under his command and for permission to submit this paper for publication.

A CASE OF RAT-BITE FEVER.

BY CAPTAIN J. W. C. SYMONDS,

Royal Army Medical Corps.

ALTHOUGH many cases of rat-bite fever have been reported, especially in America, few cases have come to light in this country. It has therefore been thought worthwhile to record the following case:—

Private C. was a rat-catcher before the war and has been carrying out this work at a Military Hospital since his enlistment two years ago. He has caught thousands of rats and has been bitten about a dozen times with no untoward result but, on August 6, 1942, he was admitted to hospital with the following history:—

Fourteen days previously he had been bitten by a rat on the dorsum of the left hand in the region of the second metacarpophalangeal joint. The wound had been cauterized with silver nitrate and dressed with antiseptics. There had been a little local inflammation but this was subsiding when, on the day before admission, the area became painful and swollen and malaise, headache and anorexia occurred. On admission the temperature was 101° F., pulse 88, there was an inflamed indurated swelling in the region of the wound presenting a bluish-red appearance and discharging a little serum from its centre; there was lymphangitis of the forearm and axillary adenitis. During the next few days the temperature rose to 103° F., and the patient looked pale and toxic; there was no rash neither was there any arthritis. The pyrexia continued for four or five days and then the symptoms and signs abated. The hand showed no signs of abscess formation. A culture of the serous discharge from the wound grew *staphylococcus aureus*. The Wassermann reaction was not performed. There was no relapse of the fever but, although the local condition cleared up fairly quickly, convalescence was slow and the patient's general condition was poor. Treatment consisted of sulphanilamide by the mouth with local applications of heat to the wound. No injections of arsenic were given.

On the fourth day after admission, an axillary gland was aspirated and the culture of the fluid obtained grew *streptobacillus moniliformis*. The following is a detailed account of the laboratory examination: The blood-

stained fluid obtained was examined by dark field illumination for spirilla without result. A few drops were also inoculated on a blood agar plate on which after twenty-four hours' incubation a pure growth was found. This consisted of circular colonies 1 to 2 mm. in diameter, low convex with a regular outline and smooth glistening appearance like beads of serum. These colonies were made up of Gram-negative bacilli, mostly 4 to 6 microns in length with a few longer forms; subcultures on Loeffler's serum gave a dense network of Gram-negative branching filaments after eight hours' incubation, but examination of the same culture eighteen hours later showed Gram-negative bacilli with no sign of filamentous forms. Growth occurred on media containing blood or serum without difficulty. No sugars were fermented. Contrary to other reports the organism remained viable on Loeffler's serum at room temperature for three weeks. Attempts made to show antibodies in the patient were not successful through inability to produce a stable suspension of the organism.

DISCUSSION.

The characteristic features of this disease are now generally recognized and the case described above conforms to many of them. It is an infectious disease following the bite of a rat or an animal preying on rats, such as the weasel, cat or dog. It has generally been considered to be due to infection with a spirochæte, *spirillum minus*, but there are in the literature a few cases reported which were due to *streptobacillus moniliformis*. An Editorial in the *British Medical Journal* [1] points out that "this organism has been occasionally isolated in the past from various human illnesses but until recently has not been seriously considered as a cause of rat-bite fever. In 1933 Strangeways [2] found that *streptobacillus moniliformis* was apparently a normal inhabitant of the nasopharynx in 50 per cent of the laboratory rats and was also present in four wild rats, while unsuccessful attempts have been made to demonstrate the *spirillum* in the mouths of rats. It has therefore been considered that both of these two organisms may cause this disease." In both types of infection the clinical features are the same. The wound at the site of the bite usually heals. After a variable time, usually about a fortnight, an indurated swelling forms in the area of the scar but this does not give rise to suppuration. Lymphangitis and regional adenitis are present. At the same time constitutional symptoms are marked with sudden pyrexia, headache and malaise. A purplish maculo-papular rash and polyarthritis are often present. The Wassermann reaction may be positive. The fever lasts for three or four days and then falls by crisis. It rises again after a period of four to seven days and, if left untreated, many relapses occur, giving rise to a secondary anæmia. There is usually a leucocytosis. Response to treatment with one of the intravenous arsenical preparations is excellent in the spirillar cases, two injections usually being sufficient, but has not been so well marked in the streptobacillus ones. Treatment with sulphonamide has been successful in one or two cases reported.

Although few cases have been reported in this country it is a diagnosis to be considered in cases exhibiting one or more of the above signs, especi-

ally amongst men whose work brings them into contact with any of the animals mentioned above.

SUMMARY.

The case described in this article brings out the following points:—

- (1) The flare up of the wound after an interval of a fortnight with general constitutional symptoms.
- (2) The characteristic local signs with no suppuration.
- (3) The recovery of the *streptobacillus moniliformis*.
- (4) The response to treatment with sulphanilamide with no relapse of the fever.

I should like to thank my Commanding Officer, Colonel F. C. Chandler, M.C., for his permission to forward this case for publication, also Lieutenant-Colonel E. G. H. Cowen, R.A.M.C., and Major J. Boycott, R.A.M.C., for their help with this article. Major Boycott also carried out the bacteriological examinations.

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DIAPHRAGMATIC DYSPNŒA.

By LIEUTENANT G. H. DAY, M.A., M.D.CAMB.,
Royal Army Medical Corps.

THE commonest disorder of the respiratory system in the British Army would appear to be dyspnœa due to faulty diaphragmatic function. Such was the writer's experience when examining batches of soldiers referred to the Norfolk and Norwich Hospital on account of respiratory distress discovered during their training.

History.—This condition manifests itself comparatively late in a man's training. He can march with full equipment at a "reasonable" pace indefinitely, he can stand up to P.T. and he can play some games; but when he reaches a certain point in intensive training and has to run over "assault courses" he becomes a hopelessly dyspnœic. In his own words he "gets whacked" by exertion which his fellows can encompass with little distress. No amount of perseverance or determination on his part will improve his "wind."

Past History.—Will reveal nothing suggestive of organic disease.

Physical Signs.—On ordinary routine clinical examination, these are not suggestive of anything except "chronic emphysema," by which name the condition is most frequently labelled. The respiratory excursion of the thoracic cage is generally excellent but there is diminution of breath sounds at both bases. Careful percussion during respiration will reveal absence of shifting dulness over the costo-phrenic margins and inspection and

measurement of the abdominal girth will reveal little or no expansion at full inspiration.

X-ray Photography.—Generally reveals perfectly normal-looking lungs.

Fluoroscopic Examination.—Is the only procedure by which diagnosis can be established or confirmed. The excursion of the diaphragm during the respiratory cycle will be found to be slight, absent, or even paradoxical.

Differential Diagnosis.—Of the cases examined the various clinical diagnoses were: "Chronic emphysema (with or without bronchitis)." "Right-sided heart failure." "Pulmonary Tuberculosis." All of which complaints, be it noted, bring about down-grading, if not discharge, in the Army; whereas functional inaction of the diaphragm should be curable.

Suggested Treatment.—Diaphragmatic breathing exercises controlled by fluoroscopic examination and spirometry.

By holding a mirror in front of the fluoroscopic screen at such an angle that the men could watch their diaphragmatic movements I was able to inaugurate considerable improvement in the two or three cases in which I had leisure enough to attempt re-education.

The importance of the recognition and treatment of this condition is sufficiently obvious to require no emphasis.

AN IMPROVISED HOT AND COLD SPRAY BATH FOR USE IN THE FIELD.

BY MAJOR H. H. CLAY,

Royal Army Medical Corps.

FEW things are of greater value to troops in the field than adequate facilities for getting a bath and there can be little doubt that, from every point of view, the most practical and at the same time the most agreeable provision that can be made is some form of spray bath, preferably with hot as well as cold water supply. That the need for some such provision is real is evidenced by the many efforts made by units on active service to meet it.

In the nature of things many of the apparatus produced are neither easy to make nor economical to run: many of them cannot properly be classed as improvisations and are possible only to units possessing skilled mechanical personnel and well-equipped workshops. This is especially the case when attempts are made to provide hot as well as cold water baths.

A spray bath apparatus capable of meeting the needs of any large unit is necessarily complex and to some extent cumbersome but, for small units, of which in modern conditions there are so many, it is definitely possible, without going beyond the bounds of improvisation, to make and set up an apparatus which is at once simple and efficient, and even mobile.

differences in levels can be obtained—as is often the case—the reservoir can be filled by gravitation and no pump is necessary. In either case, the “cold supply” must be arranged to discharge into the reservoir at a point not more than 6 inches above the bottom.

The boiler is improvised from a 5-gallon oil drum. This is set in a simple fire-box made of bricks or in the form of a sheet iron shield covered with turf exactly similar to that commonly used in connexion with a Serbian Barrel current steam disinfecter.

The boiler is connected to the reservoir by a couple of $\frac{3}{4}$ or 1 inch pipes arranged to form a simple hot water circulating system. The “flow” pipe is taken from the top of the boiler and connected to the reservoir—preferably in an upward direction—at a point half-way up its effective depth. The “return” pipe is taken from low down in the boiler and connected to the bottom of the reservoir. Arranged in this way the cold supply and the circulating pipes cause the reservoir to act as a storage unit for both hot and cold water. This method of storing both hot and cold water in a single unit is one largely used in small standardized gas-heated apparatus. Owing to the difference in densities a well defined stratification occurs between the hot and cold water; one is not affected by the other, the hot water is as efficiently stored as it would be in a separate reservoir.

At a convenient height branch pipes $\frac{1}{2}$ inch in diameter are taken from the “flow” pipe to provide hot water and from the “return” to provide cold water; these are provided with valves marked or coloured to indicate hot or cold water and are connected to an improvised spray.

In any spray bath using hot water, some arrangement to prevent the possibility of scalding is essential. The spray unit—shown in detail in the illustration—is made from a 3-pound jam tin and arranged to form an efficient “mixing chamber” which stands permanently full of water. The hot water supply is brought into it at the bottom of the chamber and is thus mixed with the water contained therein and with any cold water admitted before passing to the spray. The inadvertent use of water that is too hot is thereby effectively prevented.

In the illustration, only the short connexions to the boiler, etc., are shown in iron pipe. Any odd pieces are suitable. The circulating and other parts of the system are formed by joining these together with odd pieces of salvaged rubber hose with “slip” joints. This greatly simplifies construction and dismantling for removal. It also simplifies transport.

A simple indicator or “tell-tale” is arranged as shown to show automatically the level of the water in the reservoir: the float is a sealed milk or jam tin.

Persons using the bath stand in a sheet metal tray having a trough discharging to a soakage pit. If thought necessary this tray could be used to contain a mild disinfectant as a foot bath. Alternatively a duck-board may be used in place of the tray. Where the number of bathers is likely

to be few the soakage pit may be immediately under the apparatus as shown in the illustration.

This bathing apparatus is in every sense an improvisation the making of which is well within the scope of any small unit in the field. The only "fittings" required are the two half-inch valves and, perhaps, a small pump.

The writer is indebted to Colonel E. B. Allnutt, *M.C.*, Commandant of the Army School of Hygiene, for permission to send these notes for publication.

Current Literature.

MINISTRY OF HEALTH. **Pulmonary Tuberculosis.** Memo 266/T. 29 pp. 1943, Apr.

———. **Tuberculosis.** Circular 2794. 2 pp. 1943, Apr. 22.

Memo. 266/T is a remarkable one in many ways. It conveys to the public or, perhaps, we should say, to the medical public, not only a sound summing up of the situation of the person about to be examined—"the patient may feel perfectly well or he may feel 'off colour' without any very definite or alarming symptoms"—but also a definite plan for the initiation of miniature radiography and a well-thought-out summary of the assistance which the Treasury, through the Local Authorities, is now prepared to give to the tuberculous "to provide adequate maintenance for persons undergoing treatment and their dependants and to enable specific standing charges associated with the maintenance of the home to be met while the breadwinner is undergoing treatment." It is, in fact, the expression of the Government's policy of attacking tuberculosis by early diagnosis and treatment.

Such a memorandum does not lend itself well to summary and the original should be in the hands of all those dealing with the tuberculous. We shall attempt, however, to extract certain portions for this *Bulletin*. To begin with mass miniature radiography: "The sets by which mass radiography is operated are the result of long and careful expert work." The early use of the sets available in the coming months "must necessarily be experimental to a considerable extent." The Department of Health and the Authorities may have to review and possibly alter the arrangements in the future but, as far as can be foreseen, the following will be operative: "so long as the limitation on the supply of sets exists, the local authority should endeavour to concentrate on the examination of selected groups of the population. The groups to be selected may well vary from place to place in the light of local conditions and it is not proposed, at least during the initial period while the scheme may be regarded as experimental, to attempt to lay down any rigid conditions governing the selection of groups. The main consideration will no doubt be (a) the desirability of selecting groups that can conveniently be brought to, or dealt with at, a single centre, and (b) the facts

that, on the one hand, adolescents and young adults are the most susceptible to tuberculosis infection and that, on the other hand, experience has shown that there is a relatively larger amount of unsuspected tuberculosis in middle aged people and that these are frequently sources of infection. These considerations point to an appropriate selection from among organized groups that can be readily assembled at the place where the set is installed. Appropriate groups of these classes may be found, e.g. among the school leavers, students in Teachers' Training Colleges, among staff employed by the Authority themselves or by large public utility commercial or industrial undertakings. Account should also be taken of the advantages of radiological examination of pregnant women attending at Maternity and Child Welfare Clinics."

The basic idea is that: "(1) The detection of tuberculosis at an early stage, before it can lead to permanent impairment, is in the interest of the individual worker, of the general body of workers and of the national production capacity.

"(2) If tuberculosis is detected early by miniature radiography there is a greatly increased probability that it can be arrested by a comparatively short period of sanatorium or dispensary treatment, with the prospect of early return to working efficiency and the subsequent maintenance of a normal level of health. In many such cases no institutional treatment at all may be necessary but the individual can continue to lead a normal life with a measure of care under skilled medical direction for a period. Other chest diseases, though not to the same marked extent, are likely to respond favourably to early treatment.

"(3) The risk of infection to other workers will be reduced by bringing under suitable treatment and advice those in whom signs of active tuberculosis are disclosed.

"(4) It should be made clear that it is for the individual to decide whether he will take advantage of the offer and no sort of pressure must be put on those invited."

The matter is brought down to a fine point as between the Local Authority and the individual in the following words:—

"Miniature radiography enables arrangements to be made for the periodic examination of groups of supposedly healthy persons. Where no abnormality is found, all that is necessary is to retain on the records information which will enable the Authority to offer re-examination at some date in the future; it is provisionally suggested that yearly intervals would be appropriate. Where some abnormality is found, a full size film will be required in order to assist in determining the nature of the abnormality. Where this is a condition which suggests tuberculosis, the case will become the concern of the Tuberculosis Officer concerned who will take the same action as he would take in any suspected case that comes to his notice in other ways."

The memorandum at this point leaves the subject of mass miniature radiography to discuss the intentions of the Government as to the tuber-

culous person undertaking treatment, whether this person has been found to be affected in the course of radiographic examination or has come to the Tuberculosis Officer's notice in some more orthodox way. "In cases in which tuberculosis is diagnosed the Tuberculosis Officer should, in consultation with the patient's own doctor, do all that is possible to persuade the patient to undertake early treatment." To mitigate financial difficulty, which in most cases must necessarily arise with the transfer of the breadwinner or his mate to a sanatorium or to mitigate such restricted activity as must arise when he is placed under treatment, the Minister of Health "has made available to Local Authorities funds for the payment of allowances to persons who have to give up remunerative work in order to undertake treatment." The allowances now given over and above those already in existence, are as follows:

"(1) A standard rate of maintenance (described as 'maintenance allowances') payable without inquiry into means (beyond inquiry to establish whether the employers are continuing to pay any wages during sickness and, if so, to what extent; the amount of any National Health Insurance benefit payable and the amount of any treatment allowance or disability pension or pension allowances received from the Ministry of Pensions) to which will be added actual rent and rates up to a maximum of 15s. per week;

"The maintenance allowance should meet the needs of the ordinary case, but for cases of special difficulty there will also be available, on application:—

"(2) Additional payments (described as 'discretionary allowances') at the discretion of the Authority (acting normally through an appropriate officer) and after need has been established, towards meeting exceptional commitments in the way of charges incurred for high rent, mortgage, education, insurance, hire purchase or the like, which were not unreasonably incurred before the need for treatment was known but which cannot be met unless some additional grant is made.

"(3) Other additional payments (described as 'special payments') at the discretion of the Authority (acting normally through an appropriate officer) and after need has been established, for the purposes and in the circumstances described in paragraph 45 below."

Maintenance Allowances will be as follows:—

	s.	d.
(a) For male applicant and wife, or female applicant with dependant husband (jointly)	39	0
(b) For male or female applicant where rate (a) does not apply	27	0
(c) For dependants (other than wife or husband):—		
Aged 16 and over	12	0
Aged 14 and under 16	8	0
Aged 10 and under 14	6	6
Aged under 10	5	0

The rates may be increased according to a scale given for arrangements as to maintenance.

Discretionary Allowances, in contrast to the standard maintenance scales, "will be paid only on special application by or on behalf of the patient and only on proof of need."

Special Payments may also be made, such as "Reasonable travelling expenses incurred by near relatives," payment not exceeding 10s. a week for expense involved, when the person undertaking treatment is the housewife, in obtaining domestic help from outside the household, and, where the payment cannot be met from National Health Insurance benefit, "a reasonable allowance not exceeding 5s. a week for pocket-money."

It will be seen that the intention is generous. It must remain the province of Local Authorities to make it so in fact. There are certain obscurities in the text. On page 12, for instance, it is laid down that "the needs of the individual and the importance of securing proper treatment are not . . . governed by the date of diagnosis or the stage of the disease: assistance from the Exchequer to the Authorities will be available on the same conditions for all persons undertaking approved treatment for pulmonary tuberculosis under the tuberculosis scheme of the Authority." And yet, on page 18, it is stated that "it is clear that the purpose of the allowances (as described above) cannot be met where treatment cannot do more than alleviate a chronic condition." [We favour the last utterance and are quite with the Minister in his definitions, which follow, of what is meant by "treatment." It may be that this slight obscurity does not really exist and that we have misread the document. If so, others may do the same.]

[It will be noticed that this memorandum places an increased burden and an increased responsibility on that hard-worked and excellent physician, the Tuberculosis Officer. This increased burden should be recognized and this increased responsibility made good by a larger remuneration and an enhanced position. At the same time, the selection and training of Tuberculosis Officers ought to be taken a step farther. A Medical Officer of Health has to possess a D.P.H. in order to ensure his qualification for his post. Should not the Tuberculosis Officer, likewise, be expected to present a T.D.D. or some similar academic document to prove his right to be considered for such very important functions?]

Reprinted from "Bulletin of Hygiene," Vol. 18, No. 8, 1943.

ROSE. Advances in the Control of Body Lice. *Reichsgesundheitsblatt*, 18, 53, February 3, 1943.

The author states it is an indisputable fact that it is hardly feasible to make sufficient typhus vaccine in the near future, at all events while this war is still on, for military and civil personnel who are exposed to risk. It is also true even if further improvements in technique and the discovery of new methods enable the vaccine to be produced on a larger scale. Although it cannot be denied that typhus infection can occur in individual cases

through the inhalation of desiccated excreta of typhus infected lice yet this method of transmission can be completely ignored in considering typhus as a large scale epidemic disease. Rose stresses that, in the campaign against typhus, first priority must be given to preventing lousiness and to delousing once it has occurred. If necessary this alone can enable us to overcome the menace of typhus.

In the last war the most common and the most effective method of delousing was by hot air or hydrocyanic acid. Stagnant hot air has again proved its effectiveness and possesses the great advantage that suitable installations can be erected according to the universally known principles and with locally obtained material. On the other hand, circulating hot air has the advantage that the material to be deloused can be more quickly penetrated and uniformly heated and, consequently, the time taken can be shortened. A new limiting factor has arisen in this war in that modern leather goods cannot be treated by hot air. Tanning methods to-day have the disadvantage that if leather is exposed to hot air, especially repeatedly, it does not show damage at once but the durability is greatly reduced. 35° C. is the highest temperature permissible for leather, and this is below the insecticide level. Thus special installations must be added for delousing leather. Cresol has been recommended, but the materials must afterwards be dried. The best form of treatment is a gas such as Ventox. Hydrocyanic acid is first amongst the gas processes, and a circulation apparatus for gas delousing chambers has improved reliability and safety. Ventox is poisonous and lacks sufficient warning effect. Its application has already caused serious, almost fatal, accidents though only when the rules for its use were broken. Other gas preparations mentioned are Tritox. Illo and Areginal.

Of the materials recommended in peace-time against body lice, blue ointment cannot now be used owing to scarcity. Those which work quickly depend partly on chemical and partly on mechanical effect; for example, the mixture of pumice powder, petroleum and soft soap in the proportion of 3:2:1, or pumice, soda and prepared chalk in the proportion of 2:1:3. Methyl salicylic ester is recommended for treatment of the body hair on account of its rapid action. Amongst the new proprietaries Lousex has given good results but it is not in free supply. Doctors have been asked by laity for an anti-louse powder which they can use on their bodies and on their clothes. Hitherto such a powder has not been advised owing to unreliability, difficulty of distribution throughout the clothes and because of soiling. Certain of the xanthogenates are known to be effective for this purpose but, on account of their very offensive odour, they have never been popular in Germany. The preparation known as Aulinogen (bisethylxanthogen) has been restricted in its use to veterinary practice. The offensive smell has not prevented its use by the Russians. In the form of K-soap it was discovered last year and has been successfully used by them. In order to meet the

request of the soldiers for an anti-lice powder which they themselves could apply, the army introduced Russla powder, but practical experience has shown that the offensive smell has made it difficult to popularize its use. In practice, the use of xanthogenate in soap form is effective for only a restricted period. Recently two preparations of this kind have been produced in Germany which destroy not only the lice but also their eggs and also protect against further louse infestation. Their efficacy only lasts for a restricted period. A disadvantage attached to these two preparations is that their application must be repeated at intervals and a considerable length of time is required for drying the thoroughly wetted clothing. Nevertheless this method represents an important advance in delousing. It may be briefly mentioned that, in connexion with chemical cleansing of clothes with fat solvents, especially with the addition of tetromin such as is customary, simultaneous disinfection and cleansing is also completely satisfactory for delousing.

Reviews.

AFTER-CARE AND REHABILITATION. Edited by Sir Humphry Rolleston, Bt., G.C.V.O., K.C.B., M.D.Camb., F.R.C.P., and Alan Moncrieff, M.D.Lond., F.R.C.P. London: Eyre and Spottiswoode. 1943. Pp. 128. Price 8s. 6d.

This small book, the ninth in the series of *The Practitioner* booklets, deals in a brief way with the after-care and rehabilitation of a wide range of conditions, with special emphasis on mass or group methods. After an excellent and stimulating introduction by Professor F. R. Fraser, there are three chapters devoted to the Medical, Surgical and Anæsthetic aspects of post-operative care and, in spite of some inevitable repetition, these succeed in giving much useful information. There follows an interesting chapter on post-operative nervous and mental complications. The after-care of acute medical diseases, amputations and pulmonary tuberculosis is then dealt with, in a series of articles, and a description is given of the principles of practice of the modern Tuberculosis Colony. The section on rehabilitation is, on the whole, unsatisfactory and the reader who expects to find many practical hints will be disappointed. The chapter on rehabilitation in patient confined to bed has three appendices describing practical exercises. These unfortunately include wall exercises for posture which could only be used for patients who are ambulant. There is a clear general description of the field and purpose of occupational therapy and a chapter, the most instructive in the book, on the uses of physio-therapy in post-operative convalescence. It would have been of help to those wishing to read further on any one of these subjects if a greater number of references had been given since, with such a small space at their disposal, it was clearly impossible for the various authors to do more than touch the fringe of their subjects.

THE ESSENTIALS OF MODERN SURGERY. Second Edition. Edited by R. M. Handfield-Jones, M.C., M.S., F.R.C.S., and A. E. Porritt, M.A., M.Ch., F.R.C.S., Lieutenant-Colonel, R.A.M.C. Edinburgh: E. & S. Livingstone. 1943. Pp. xvi + 1204. Price 40s. net.

In the second edition of this work the authors have adhered to their original aim, that of considering pathology and general principles rather than detailing technique. The complete realization of this idea, in dealing with a subject as practical as surgery, is clearly impossible but it may be said that the result is an attractive and readable volume.

The chapter on hernia presents an outstanding example of adherence to the main ideal; despite the very excellent figures with which it is illustrated it may be doubted if it will give a balanced view of the subject to the uninitiated.

It is noteworthy that no attempt has been made to write up "war surgery" as a special subject. The decision is probably wise though an infusion of recent Army experience in the treatment of burns would have improved this section.

The chapter on hæmorrhage and shock is compact and up to date. The authors reserve judgment in the assessment of the value of the sulphonamide group of drugs in surgery and none of these appears by name in the index.

The book is beautifully produced and appreciably brightened by the inclusion of reproductions of six paintings by Miss Anna Zinkeisen. The student who has mastered this volume can face any reasonable examiner with confidence.

C. M. P.

A HANDBOOK FOR THE IDENTIFICATION OF INSECTS OF MEDICAL IMPORTANCE.

By John Smart, Ph.D. London: By Order of the Trustees of the British Museum. 1943. Pp. x + 269, with 13 Plates and 177 Figs. Price 15s.

The author has collected together, revised and, in many cases, originated a number of keys for the quick identification of the Old World arthropods of known medical importance, together with some general notes on the subject. The whole book is generously illustrated.

The book fulfils a long felt want of medical officers, entomologists, public health officers and others for a single publication that will enable them to identify insects sent to them. The keys permit identification down to genus and in some cases to species.

The book will prove to be extremely valuable and indispensable for the field worker.

H. C.-B.

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Corps News.

DECEMBER, 1943.

EXTRACTS FROM THE "LONDON GAZETTE."

November 18, 1943.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Sicily :—

The Military Cross.

Capt. (temp. Major) Martin Edward Meakin Herford, *M.B.E.*, *M.B.* (175256), Royal Army Medical Corps (Reading).

Capt. Basil Ernest West Aldwell, *M.B.* (89872), Royal Army Medical Corps (Dublin).

Capt. John Stuart Martin, *M.B.* (131321), Royal Army Medical Corps (Cookstown, Co. Tyrone).

Capt. Jan Miedema, *M.B.* (136161), Royal Army Medical Corps (Minneapolis, U.S.A.).

The Military Medal.

No. 7343743 Cpl. Frederick John Dommett, Royal Army Medical Corps (Ogmore-by-Sea, Glam.).

November 25.—The KING has been graciously pleased to approve the award of the George Medal, in recognition of gallant conduct in carrying out hazardous work in the Middle East in a very brave manner, to the undermentioned :—

Major (temp. Lt.-Col.) Robert McIntyre Gordon, *D.S.O.*, *D.F.C.*, *M.B.*, Royal Army Medical Corps.

November 25.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in the Middle East :—

To be an Additional Commander of the Military Division of the said Most Excellent Order.

Brig. (temp.) Rudolf William Galloway (5839), late Royal Army Medical Corps.

To be Additional Officers of the Military Division of the said Most Excellent Order.

Major (temp. Lt.-Col.) Charles William Arnot, *M.C.*, *M.D.* (73535), Royal Army Medical Corps (Gateshead-on-Tyne).

Major (temp. Lt.-Col.) Douglas Waddell Jolly, *M.B.* (136344), Royal Army Medical Corps (London, N.12).

Col. (temp.) Francis Robert Henry Mollan, *M.C.* (5666), Royal Army Medical Corps (Durban, S. Africa).

Col. (temp.) John Gwynne Morgan, *M.B.* (35510), Royal Army Medical Corps (Llandilo, Carmarthen).

Major (temp. Lt.-Col.) Arthur Noel Burchill Odbert, *M.B.* (42438), Royal Army Medical Corps (Natal, S. Africa).

Major (temp. Lt.-Col.) Phillip John Richards (51985), Royal Army Medical Corps (Hailsham).

Lt.-Col. Ronald MacLure Savege, *M.C.*, *M.B.*, *F.R.C.S.* (25805), Royal Army Medical Corps (London, S.W.6).

Major (temp. Lt.-Col.) Horace Smith Ward (33741), Royal Army Medical Corps (Torquay).

To be Additional Member of the Military Division of the said Most Excellent Order.

Capt. (temp. Major) Arthur John Craig Latchmore, *M.S.*, *F.R.C.S.* (87660), Royal Army Medical Corps (Leeds, 6).

November 25.—The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division), in recognition of gallant and distinguished services in the Middle East, to the undermentioned :—

No. 7258480 Sjt. Charles Henry Price, Royal Army Medical Corps (London, W.6).

November 25.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the Middle East :—

The Military Cross.

Capt. David Rumney (195578), Royal Army Medical Corps (Watford).

The Royal Red Cross.

To be Additional Associate of the Royal Red Cross, Second Class.

Miss Eva McIntosh (206294), Sister (actg. Matron), Queen Alexandra's Imperial Military Nursing Service (Glasgow).

Bar to the Military Medal.

No. 7350296 S/Sjt. Thomas Gowan, *M.M.*,
Royal Army Medical Corps (Newcastle-on-Tyne).

The Military Medal.

No. 7257651 Sjt. Harold Phipps, Royal
Army Medical Corps (Bristol).

No. 7395172 Pte. John Argyle Aitken,
Royal Army Medical Corps (Edinburgh).

No. 7265373 Pte. Frank Kelly, Royal Army
Medical Corps (Leeds, 9).

November 25.—The KING has been
graciously pleased to approve that the
following be Mentioned in recognition of
gallant and distinguished services in the
Middle East :—

Capt. E. F. Ridley, *M.B.* (188842).
7523513 S/Sjt. (actg. *W.O.2* (*Q.M.S.*)) C.
F. Stone.

November 25.—The KING has been
graciously pleased to approve that the

following be Mentioned in recognition of
gallant and distinguished service in Wazi-
ristan :—

7535553 Sjt. W. W. Pryke.

November 30.—The KING has been
graciously pleased to approve the award of
the George Medal, in recognition of conspicu-
ous gallantry in carrying out hazardous work
in a very brave manner, to the under-
mentioned :—

Lieut. Brian Brownscombe (246170), Royal
Army Medical Corps (Harrow, Middlesex).

November 19.—The undermentioned to be
Majors :—

Capt. (temp. Major) J. O'Connell, *M.D.*
(63809), Oct. 30, 1943.

Capt. (war Subs. Major) (temp. Lt.-Col.)
J. A. D. Johnston, *M.C.*, *M.B.* (63802),
Nov. 1, 1943.

Capt. (war Subs. Major) E. H. P. Lassen
(63168), Nov. 7, 1943.

REPATRIATED PRISONERS OF WAR.

Major E. Davies Thomas.
Capt. J. H. Bolton.

Capt. F. Duval.
Capt. E. Gartside.

ESCAPED PRISONERS OF WAR.

Capt. L. V. MacDonald.

Capt. N. C. Rogers.

DEATHS.

Major S. Brown. Killed in action, Italy.
Major A. G. Porter. Killed in action, Italy.
Capt. J. O. D. Williams. Killed in action,
Italy.
Capt. I. G. McCall. Killed in action, Italy.
Capt. R. Provan. Killed in action.
Capt. N. N. Wilson. Died, N. Africa.
Capt. R. K. Levick. Died, N. Africa.
Major K. C. Eden. Died, N. Africa.
Capt. J. H. B. Round. Died, Paic.

PARÉS.—On Nov. 17, 1943, at Posford,
Woking, Surgeon Lieutenant-Colonel Basil
Pares, *C.M.G.*, *D.S.O.*, late 1/Life Guards
and Royal Horse Guards. Born April 24,
1869, he was educated at Lancing College
and Emmanuel College, Cambridge, and
took the *M.R.C.S.* and *L.R.C.P.* in 1898.
Having served as a Civil Surgeon from
Oct. 20, 1898, till Nov. 13, 1900, he was
commissioned Lieutenant *R.A.M.C.* Nov.
14, 1900. Transferred as Surgeon Lieuten-
ant to the 1/Life Guards Oct. 15, 1902,
he was promoted Surgeon Captain Nov. 14,
1903. Promoted Surgeon Major Royal
Horse Guards Nov. 17, 1906, and Surgeon
Lieutenant-Colonel Feb. 12, 1919, he

retired on account of ill-health May 17,
1922. He served in South Africa 1899-
1901, taking part in the Relief of Kimber-
ley; operations at Paardeberg (Feb. 17 to
26, 1900); actions at Poplar Grove,
Dreifontein, Vet River (May 5 and 6, 1900)
and Zand River; and operations in Cape
Colony. He received the Queen's Medal
with five Clasps. He served in France
1914-1915, and in Egypt 1915-1916. Thrice
mentioned, he was created *C.M.G.*, awarded
the *D.S.O.*, Order of St. Sava 4th Class,
the 1914 Star and Clasp, the British War
and Victory Medals.

GILMOUR.—In Edinburgh on Nov. 22, 1943,
Major John Gilmour, *C.M.G.*, *M.C.*,
R.A.M.C., retired. Born in Edinburgh
Sept. 25, 1884, he took the *M.B. Edin.* 1906,
and the *F.R.C.S. Edin.* 1909. Commissioned
Lieutenant *R.A.M.C.* Jan. 28, 1910, he was
seconded for duty with the Public Health
Department of the Government of Egypt
Dec. 8, 1911, to Jan. 6, 1915. Promoted
Captain July 28, 1913, he received the
Brevet of Major June 3, 1918, and retired
receiving a gratuity Feb. 23, 1919. He was

with the League of Nations Mission to Persia in 1924. He was President du Conseil Sanitaire Maritime et Quarantine d'Egypte, Alexandria, Egypt 1929-1939. He was created C.M.G. Jan. 1, 1934. He was a Grand Officer of the Order of the Nile, a Commander of the Order of George I of Greece, a Chevalier of the Legion of Honour and a Grand Officer of the Order of Ismail (Egypt). He published "Report on Investigations into Sanitary Conditions in Persia," League of Nations, 1924, and "Rapport Annuel sur le Pelerinage au Hedjaz," International Health Office, Paris, 1928-1938. He was in Egypt on the outbreak of the Great War, and served in Egypt, Dardanelles, East Africa and Palestine, 1914-1916, and in France in 1916 and 1917. He accompanied the special mission to the United States of America in 1917-1918. The honorary degree of M.A. was conferred on him by the University of Michigan in 1917. He received the M.C., Brevet of Major, 1914-1915 Star, British War and Victory Medals.

GUBBIN.—In Crewkerne, Somerset, on Nov. 28, 1943, Lieutenant-Colonel George Frederick Gubbin, R.A.M.C., retired. Born in North Tamerton, Devon, Feb. 19, 1857, he took the L.R.C.P.Lond., and the M.R.C.S.Eng. in 1881, and the D.P.H., R.C.P.S.Eng. in 1890. Commissioned Surgeon Feb. 2,

1884, he was promoted Surgeon Major Feb. 2, 1896, Lieutenant-Colonel R.A.M.C. Feb. 2, 1904, and retired Feb. 19, 1912. He subsequently was appointed D.A.D.M.S. 1/London Division, T.A., June 1, 1912, and A.D.M.S. Feb. 11, 1916. He was relegated to Retired Pay and thanked by the Army Council Nov. 3, 1918. When serving in Bermuda he attended some German sailors, and was presented with a gold tie-pin by the Emperor of Germany. He took part in Nile Expedition of 1885.

LAUDER.—In Southbourne, Bournemouth, on Dec. 7, 1943, Lieutenant-Colonel Thomas Campion Layder, R.A.M.C., retired. Born June 8, 1873, he took the M.B.Edin. in 1897, and was commissioned Lieutenant R.A.M.C. Jan. 28, 1899. Promoted Captain Jan. 28, 1902, Major Jan. 28, 1911, and Lieutenant-Colonel March 1, 1915. He retired June 24, 1922. He took part in South Africa in the Relief of Ladysmith, including actions at Colenso, Spion Kop, Vaal Kranz, operations on Tugela Heights (Feb. 14 to 27, 1900) and action at Pieters Hill: actions at Frederickstad (Oct. 17 to 25, 1900) and actions Ruidam. He was awarded the Queen's Medal with five Clasps and the King's Medal with two Clasps. He served in Macedonia and Mesopotamia in 1915 and 1916, receiving the 1914-15 Star, British War and Victory Medals.



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